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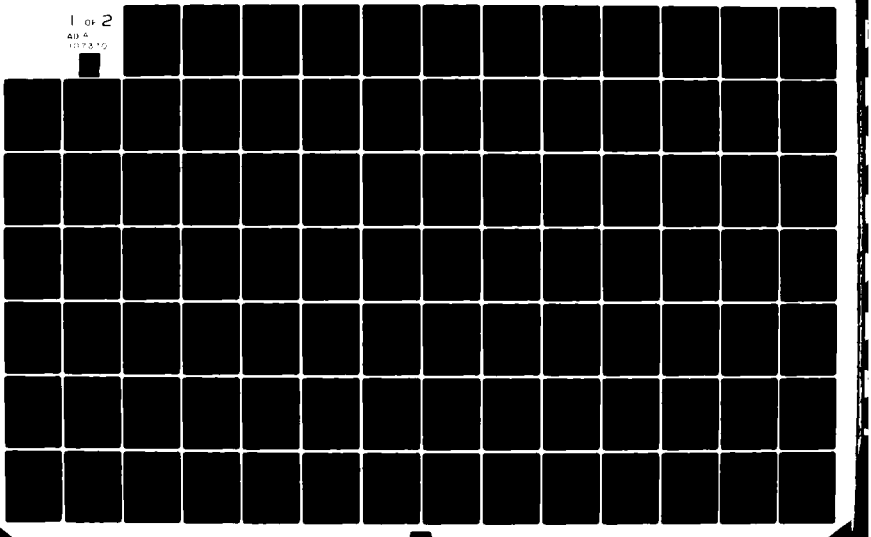

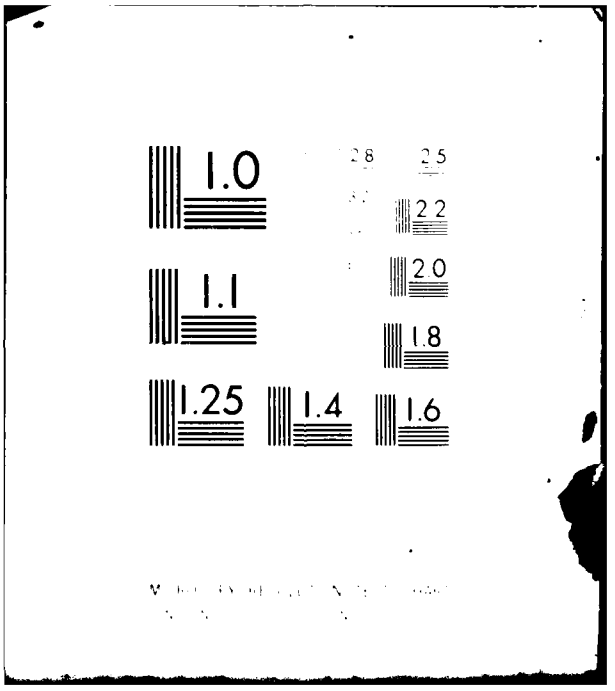
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FINAL ENVIRONMENTAL STATEMENT

MAINTENANCE DREDGING OF THE FEDERAL NAVIGATION CHANNELS IN THE DETROIT RIVER, MICHIGAN

Prepared by:

U. S. Army Engineer District
Detroit, Michigan

January 1976

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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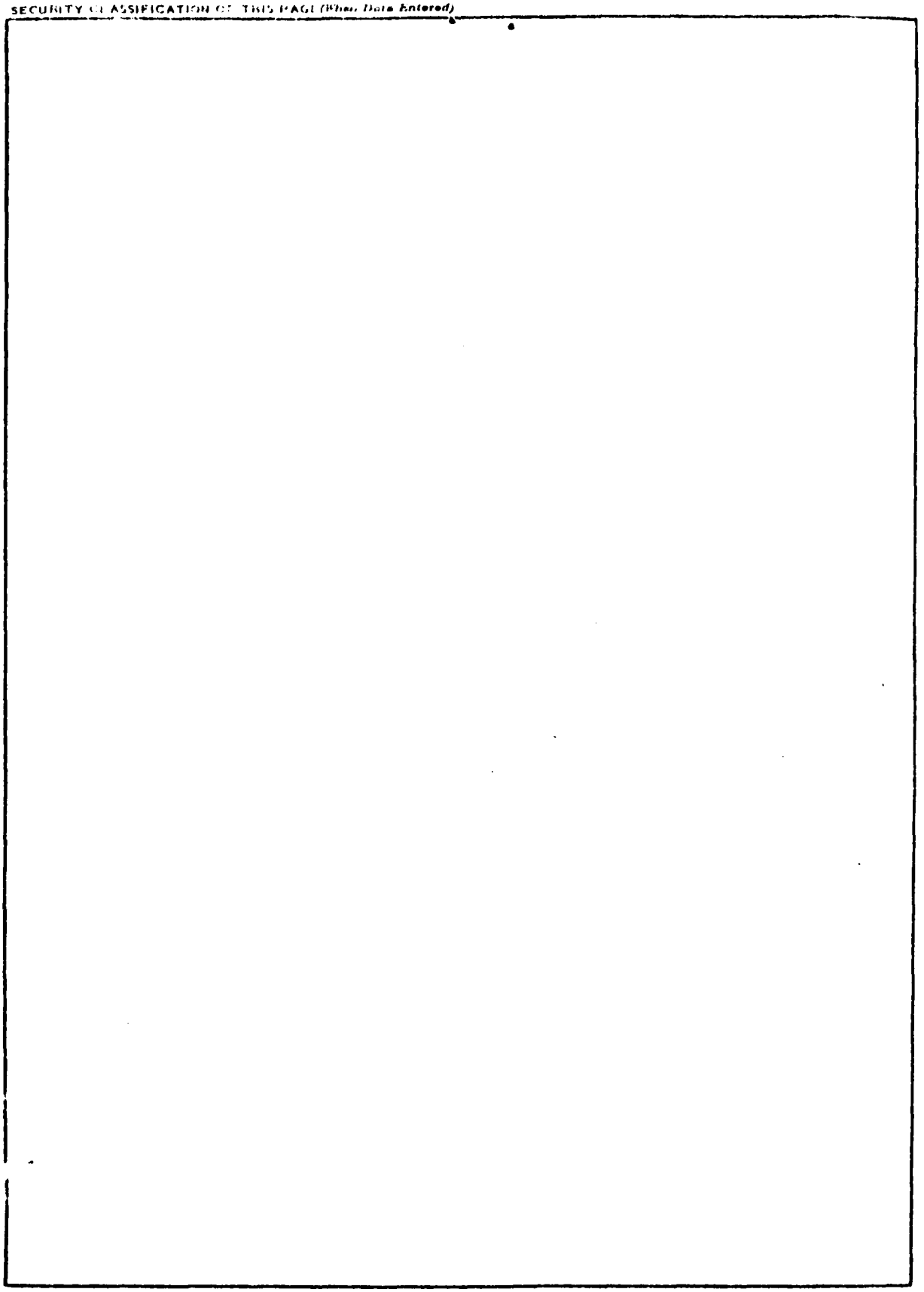


SUMMARY

MAINTENANCE DREDGING OF THE FEDERAL NAVIGATION CHANNELS IN THE DETROIT RIVER, MICHIGAN

( ) DRAFT (X) FINAL ENVIRONMENTAL STATEMENT

RESPONSIBLE OFFICE: U. S. Army Engineer District, Detroit
Corps of Engineers
P. O. Box 1027
Detroit, Michigan 48231
313-226-6752

1. NAME OF ACTION: (X) ADMINISTRATIVE ( ) LEGISLATIVE

2. DESCRIPTION OF ACTION: Maintenance dredging in the Detroit River Connecting Channels is performed annually by derrickboat to remove hard obstructions (rocky material) and periodically by hopper dredge to remove the clayey silt from the Lake Erie Sailing Course. During a 7-year period, 1963-1969, a total of 3,894,088 cubic yards of sand and silt was removed and disposed of in open water. Section 123 of the River and Harbor Act of 1970 authorized a program for construction of confined disposal facilities for containment of polluted materials. In 1970, 39,427 cubic yards of polluted material was placed into the Grassy Island disposal site. In 1973 and 1974, unpolluted material (1,231,731 and 546,589 cubic yards respectively) was dredged and disposed of in open water. In 1975, no dredging was accomplished except for some derrickboat work. Upon completion of the Pointe Mouillee confined disposal facility, an estimated 672,000 cubic yards must be removed annually to maintain the Detroit River connecting channels. This quantity does not include the backlog of shoaling that has not been removed pending construction of the new disposal facility.

3. (A) ENVIRONMENTAL IMPACTS: Resumption of the removal of polluted material will temporarily degrade the water quality and localized turbid problems are anticipated to be encountered at areas during removal of the rocky material. Disposal of the dredged material into their respective disposal sites may affect the aquatic ecosystem. Continued economic and social stability of the Great Lakes is dependent upon commercial navigation which requires maintenance dredging of the connecting channels of the Detroit River.

(B) ADVERSE ENVIRONMENTAL EFFECTS: Short-term increased turbidity and temporary water quality degradation in the area of operation are effects of maintenance dredging. Aquatic life in the dredging areas will be disturbed or destroyed. Disposal of the dredged sediments will alter existing habitats and may otherwise adversely affect organisms at the disposal areas.

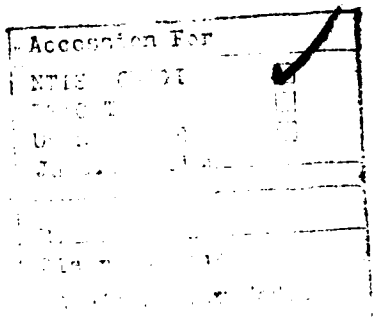
4. ALTERNATIVES: Dredging alternatives include: (1) alternative dredge types; (2) discontinue maintenance dredging completely; (3) dredge the connecting channels to a lesser depth; and (4) wastewater management. Implementation of the alternatives will cause economic or social impacts on the Detroit River area as well as the Great Lakes region. Alternatives to the disposal methods are: (1) confinement of all material; (2) disposal of all sediments in open water; (3) deep water (greater than 100 feet) disposal; (4) land disposal; and (5) pretreatment of materials. In terms of economic and engineering feasibility, irretrievable resources and minimal ecological disruption, the process of confined disposal of polluted materials and open water disposal for non-polluted sediments offers the best alternatives at the present time.

5. COMMENTS RECEIVED:

Ontario - Ministry of the Environment
Advisory Council on Historic Preservation
U. S. Department of Agriculture
U. S. Department of Commerce - NOAA
U. S. Department of the Interior
U. S. Department of Transportation - Federal Highway Administration
U. S. Environmental Protection Agency
State of Michigan - Department of Natural Resources
State of Michigan - Historic Preservation Officer
Pointe Mouillee Waterfowlers Association
Southeast Michigan Council of Governments
City of Detroit - City Engineering Department
City of Detroit - Planning Department
United States Steel Corporation

6. Draft Statement to CEQ 25 September 1975.

7. Final Statement to CEQ _____.



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IN THE DETROIT RIVER, MICHIGAN

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FINAL ENVIRONMENTAL STATEMENT

MAINTENANCE DREDGING OF THE FEDERAL NAVIGATION CHANNELS
IN THE DETROIT RIVER, MICHIGAN

1. PROJECT DESCRIPTION

A. Scope of Work

1.01 The U. S. Army Corps of Engineers is authorized by Congress to perform maintenance dredging of the navigable waterways of the Great Lakes. These waterways provide vital transportation routes for bulk materials, economic stimulus, and increased opportunities for recreational utilization of water resources. The purpose of maintenance dredging is the restoration of authorized controlling depths in the established projects.

1.02 The established, authorized Detroit River connecting channels consist of the following segments which connect Lake Erie with Lake St. Clair (Figures 1, 2, and 3):

1. the East Outer Channel which extends approximately 7-1/8 miles from the Detroit River Light into the deep water in Lake Erie, and the sailing courses from the lakeward end of East Outer Channel through the Pelee Passage.

2. the West Outer Channel which extends about 3-1/2 miles into Lake Erie from its junction with the East Outer Channel just north of the Detroit River Light.

3. the Lower Livingstone Channel which extends about 2-3/4 miles to the lower junction of the Amherstburg Channel and the Upper Livingstone Channel just southwest of Bar Point.

4. the Upper Livingstone Channel which extends about 6-3/4 miles from its north entrance at Ballards Reef to its southerly junction with the Amherstburg Channel opposite Bar Point.

5. the Amherstburg Channel that extends about 7-1/2 miles (through the Hackett, Amherstburg, Limekiln Reaches and lower section of Ballards Reef) from the lower junction at the Lower Livingstone Channel to the upper junction with the main Ballards Reef Channel.

6. Ballards Reef Channel which is about 2-1/4 miles long from its lower end at the junction with the Livingstone Channel to its upper end at the junction with Fighting Island Channel.

7. Fighting Island Channel extends about 4-1/2 miles from its lower end at the junction with the Ballards Reef Channel to its upper end.

8. the Detroit River from North of Fighting Island to the south of Belle Isle.

9. the Head of the Detroit River Channel (also known as the Fleming Channel) extends about 4 miles from the lower end of Belle Isle to the Lake St. Clair Ship Channel.

10. the Trenton Channel is located west of Grosse Ile and extends from the Detroit River about 10 miles to the turning basin just beyond the lower Grosse Ile Bridge (Parkway Bridge).

11. the Channel north of Belle Isle (also known as the American Channel) extends about 2000 feet from the Head of the Detroit River Channel toward Conners Creek.

1.03 Sections of these connecting channels require dredging annually to maintain the depths necessary for the vessels which use the waterway. Derrickboat maintenance is performed annually (Appendix E) to remove the hard obstructions (mainly rock); annual maintenance by hopper dredge will resume upon construction of the confined disposal facility at Pointe Mouillee. See Table A for controlling depth in each reach of these channels.

1.04 In 1970 and 1973 the U.S. Environmental Protection Agency (EPA) analyzed material from the Detroit River (Appendix B), evaluated the results by using the criteria (Appendix D) for determining acceptability of dredged spoil material to the nation's waters and classified the Trenton Channel, Amherstburg Channel, and Lower Livingstone-East Outer Channel as polluted (Figure 2). Until 1969, disposal of all dredged materials was over dumping grounds located in Lake Erie in a dumping area west of the East Outer Channel. The polluted material removed in 1970 (39,427 cubic yards) was placed into the confined disposal facility site at Grassy Island in the Detroit River which had been constructed in 1960 to contain the dredged material from the Rouge River. Since the confined disposal facility (CDF) at Pointe Mouillee is not yet constructed, the polluted sediments are presently not being removed from the Detroit River.

B. Authority

1.05 The existing project was authorized by the R&H Acts of June 13, 1902; March 3, 1905; June 25, 1910; March 4, 1913; March 2, 1907; March 2, 1919; July 3, 1930; August 30, 1935; August 26, 1937; March 2, 1945; July 24, 1946; May 17, 1950; March 21, 1956; July 14, 1960; and August 13, 1968.

TABLE NO. A*

CHANNEL DATA

NAME OF CHANNEL	LENGTH	UP OR DOWN BOUND	WIDTH	DEPTH	IGLD 1955	CONTROLLING DEPTH	ADOPTED
Channel north of Belle Isle	3,000'	both	200'	21'	571.5	20.0	1945
Channel at head of Detroit River	38,000'	both	800-1200'	28.5'	571.5-570.9	28.5	1956
Miscellaneous shoals and obstructions, Belle Isle to Fighting Island	44,500'	both	800'	28.5'	571.9-570.3	28.5	1956
Fighting Island Channel	24,800'	both	800'	28.5'	569.9	28.2	1956
Ballards Reef Channel north of junction with Livingstone Channel	12,200'	both	600'	28.5'	569.4	28.2	1956
Livingstone Channel - upper	26,000'	down	450'	27.7'	569.4-568.6	27.5	1956
Livingstone Channel - lower							
CS 260/00 to CS 368/87	10,887'	down	450-800'	29.0'	568.6	29.0	1956
CS 368/87 to CS 492/00	12,313'	both	800-1200'	29.0'	568.6	28.5	1956
East Outer Channel	42,000'	both	1200'	28.5'	568.6	27.5	1956
Miscellaneous shoals and obstructions, Detroit River to Pelee Passage	-	both	-	(1)28.5-29.5'	568.6	28.5	1956
Pelee Passage shoal		both		28.5'	568.6	28.5	1956
Amherstburg Channel:							
Upper Section, Ballards Reef	6,500'	up	600'	27.5'	569.4-569.2	27.2	1956
Middle Section, Amherstburg & Limekiln Reaches	12,000'	up	(2) 600'	21.0-27.5'	569.2-568.8	20.8-27.2	1956
Lower Section, Hackett Range	24,000'	up	(3) 600'	21.0-28.5'	568.8-568.6	20.8-28.2	1956
West Outer Channel	21,000'	down	800'	22.0'	568.6	18.6	1919
Trenton Channel:							
Wyandotte Reach	31,500'	local	300'	27.0'	569.9-569.7	27.0	1960
Trenton Reach (upper)	5,100'	local	300'	28.0'	569.7-569.6	28.0	1960
Trenton Reach (lower)	20,500'	local	250-300'	28.0'	569.6-568.8	28.0	1937-50-68
Grosse Ile Shoal	600'	local	-	20.0'	569.8	19.5	1902

(1) Project depth 29.5 feet over rock shoals and 28.5 feet over other than rock shoals.
(2) Project depth 21 feet in easterly 300-foot width of channel and 27.5 feet in westerly 300-foot width.
(3) Project depth 21 feet in easterly 300-foot width of channel and 28.5 feet in westerly 300-foot width.
* Chart No. 5 from Corps of Engineers Project Maps.

These Acts provide for: improving the Detroit River main channels to provide for 25.5 foot draft navigation; improving certain auxiliary and side channels; and for construction of various water level and cross current control structures. Except for the following authorized work in the Trenton Channel, the existing project is complete: extending the turning basin located south of the Grosse Ile Parkway Bridge to its maximum dimensions; dredging through the East Draw of the Parkway Bridge; expanding to 300 feet the width of the channel south from the McLouth turning basin to the Parkway Bridge; the extension of the 28-foot depth channel downstream to Gibraltar; and the Grosse Ile shoal.

1.06 The River and Harbor Act of May 17, 1950 provided for extending the turning basin in the Trenton Channel 600 feet, dredging through the last draw of the lower Grosse Ile Bridge, and extending the 300 foot width channel north of the lower Grosse Ile Bridge. On January 8, 1970 this authorization was classified as inactive due to a substantial reduction of waterborne coal deliveries for the Detroit Edison Company's Trenton Channel Plant and the inability of local interest to provide the required assurance statement for retention of the 3-1/4 percent interest rate for project evaluation. This project was recommended for deauthorization by the Corps on June 19, 1975 and is before Congress for such consideration.

1.07 Maintenance dredging projects are reviewed and evaluated under the following laws: Fish and Wildlife Act of 1956; Fish and Wildlife Coordination Act of 1958; National Historic Preservation Act of 1966; National Environmental Policy Act of 1969; Federal Water Pollution Control Act of 1972; Marine Protection, Research, and Sanctuaries Act of 1972; Endangered Species Act of 1973, as well as the Congressional actions authorizing the River and Harbor Acts for construction and maintenance of the Federal navigation channels.

C. The Plan

1.08 Dredging Operations. The U.S. Army Corps of Engineers performs annual maintenance by derrickboat (grab dredge) in those portions of the Federal navigation channels in the Detroit River which require the removal of hard obstructions. A hopper dredge is used for periodic (as needed) maintenance of the Lake Erie Sailing Course and is proposed to be utilized to remove the contaminated materials from the sections classified as polluted upon completion of the Pointe Mouillee confined disposal facility.

1.09 A grab dredge (Figure 4), which operates from a derrick mounted on a flat-topped barge, can work in half circle, removing material between one side of the barge and the other. Two types of grab buckets are available - a clamshell and an orange peel - and they can be used interchangeably. The clamshell, which has two parts and closes like a clam, is used for mud or stiff mud. An orange peel, which has three to six sections that open and close into the shape of a ball, handles loose

rock or other hard, bulky material. Cables are used to operate the buckets in a vertical manner and then the dredged material is placed on a flat or dump scow, depending on where it is to be unloaded.

1.10 A hopper dredge (Figure 5) is designed to hydraulically dredge material while in motion. The two dragarms are lowered and the material sucked up through the dragrams and pumped into the hoppers. Pumping continues until the hoppers are filled to capacity, which is dependent upon the compactness, density, grain size, degree of retainability and the maximum loaded draft of the vessel. The hoppers are equipped with overflows to allow the excess water and silt to be discharged back to the origin until the predetermined load is attained. Then the dredge moves to the disposal site. Disposal of the polluted material is accomplished by pumpout through a discharge pipeline to the confined disposal facility (CDF). The remaining materials are flushed by jets of water and the rinse water discharged into the CDF. Overall dimensions and capacity of hopper dredges vary. Selection is made to suit the required operations. Those available on the Great Lakes range in length from 216 to 339 feet with capacities between 885 and 2,720 cubic yards.

1.11 Disposal Sites. Disposal operations, prior to 1969, had been by dumping the material into designated dumping grounds in Lake Erie. (Materials from the hard rock areas are currently being placed into the deep water dumping grounds or onto the existing compensating dikes.) This area was 15,000 feet long and 2,500 feet wide in a NW/SE direction, extending from opposite Buoy No. 3 to opposite Buoy No. 13, and parallel to and 2,000 feet westerly of the west channel line of the East Outer Channel (see Figure 2). The confined disposal facility (CDF) to be constructed at Pointe Mouillee will be used for polluted sediments from the Detroit and Rouge Rivers. (A separate EIS addresses the use of this disposal facility - "Confined Disposal Facility at Pointe Mouillee for Detroit and Rouge Rivers" - and was filed with CEQ on 5 April 1974. It has been published and is available, upon request, from the Detroit District Office.) Congress included funds for construction of the Pointe Mouillee facility in the President's budget for fiscal year 1976. Construction is anticipated to be initiated in May of 1976 with completion by September 1978.

1.12 Materials to be Dredged. Of the approximately 4,000 cubic yards of material removed by grab dredge, principally rock, one-third is disposed of in deep water outside and adjacent to the section of the channel from which it was removed. The remaining two-thirds is placed on land, primarily on the project compensating dikes, for their maintenance and repair. This work does not include dredging of the silt and fine sand shoal materials which the Environmental Protection Agency has classified as polluted bottom sediments.

1.13 This derrickboat work is expected to take place annually in the following hard bottom channels in the Detroit River: Fighting Island,

Ballards Reef, Amherstburg Channel, Upper Livingstone Channel and Lower Trenton Channel. The rocky material is placed on the deck of the derrickboat which is then towed by tug to the disposal site, where the material is off-loaded by the derrick. The working season is generally from 15 April to 15 December.

1.14 The removal of such obstructions is essential to the safe navigation of all domestic and foreign deep draft vessels sailing between Lake Erie and all Ports on the Detroit River, St. Clair River, Lake Huron, Lake Michigan, St. Marys River and Lake Superior.

1.15 Upon completion of the Pointe Mouillee CDF, annual maintenance dredging of the polluted sand and silt sediments will resume. This operation is proposed to be accomplished by a Government-owned and operated hopper dredge. Prior to the suspension of removal of polluted materials (1969) an average of about 556,000 cubic yards of material was removed annually. As the annual requirement, an estimated 672,000 cubic yards of material are anticipated to be removed upon resumption of dredging operations. Additionally, it is anticipated that dredging via contract will help to reduce the backlog of accumulated sediments.

D. Economics

1.16 A benefit-cost ratio for maintenance dredging is not required for the project work as provision for maintenance operations of the Detroit River navigation channels are contained in the original authorization for the project. The District Engineer is directed to provide maintenance of established projects. It is the responsibility of the District Engineer to be aware of the utilization at each project and to furnish the justification with a request for maintenance funds at each project.

1.17 During the 7-year period, 1963-1969, when disposal was into dumping grounds west of the East Outer Channel, a total of 3,894,088 cubic yards of material was handled at approximately $.34 per cubic yard (Table B). In 1970, 39,427 cubic yards was dredged and placed onto Grassy Island for a cost of $.79 per cubic yard. Due to the pollution status of the Detroit River and the lack of confined disposal area, dredging operations of the polluted sediments are suspended until the Pointe Mouillee Facility is constructed. Removal operations for 1973 and 1974 were confined to the Lake Erie Sailing Course only with disposal into the open water dumping grounds.

1.18 It is estimated that annual dredging in the future will be for about 672,000 cubic yards and disposal into the containment facility designed for a 10-year period. This does not include the 5 year backlog of an estimated 5,000,000 cubic yards. Under the proposed method, costs of the operations will be increased from $.34 to $4.41 per cubic yard due

to the increased cycle time required by longer travel to the disposal site and increased pumpout time required to empty the dredge. This increased cost includes the backlog of maintenance material.

1.19 The Federal Costs of the Navigation Channels in the Detroit River as of 30 June 1975 are as follows:

	Existing Project	Previous Project
New Work	$74,499,885	$2,097,254
Maintenance	11,591,558	0
TOTAL COSTS	$86,091,443	$2,097,254

2. ENVIRONMENTAL SETTING OF THE PROJECT AREA

A. Area Description

2.01 The Detroit River, one of the Great Lakes Connecting Channels, is 31 miles long and flows south from Lake St. Clair to Lake Erie. The river enters western Lake Erie at the lake's northwest corner, and supplies 90 to 95 percent of its inflow. The lower section of the Detroit River is broad, being formed of many islands and shallow expanses over a distance of about 17 miles. The section of river extending upstream to Belle Isle from Fighting Island, through the Windsor-Detroit area, is a single open-river area for more than 8 miles.

2.02 This navigation channel is maintained to depths necessary to provide a safe draft of 25.5 feet below I.G.L.D. through the Detroit River to deep water in Lake Erie. This long artery of navigational water is more like a strait than a river, serving as a vital link in the Great Lakes system. One of the busiest commercial waterways in the world, the river hums with activity during the navigation season and includes the Ports of River Rouge, Ecorse, Wyandotte, Riverview, and Trenton as well as the City of Detroit. Numerous commercial installations used for handling coal, iron ore, limestone, steel products, petroleum products, and other items including overseas general cargo are found along the waterfront.

2.03 Within the lower section of the river the main navigation channel is divided into two sub-channels, the Amherstburg (upbound) and Livingstone (downbound) Channels, separated from one another by Bois Blanc Island. The Amherstburg Channel lies in Canadian territory, with the Livingstone Channel belonging to the United States.

2.04 Apart from Bois Blanc Island, many other islands are found in the Detroit River. Grosse Ile (12 square miles) in U. S. waters, and Fighting Island (2 square miles) in Canadian territory, are the largest of these. Belle Isle and Peach Island are situated near the head of the

TABLE B

DETROIT RIVER DREDGING TOTALS

(CALENDAR YEAR)

	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963
Quantity (cubic yards)	546,589*	1,231,731*	0	0	39,427**	813,191	808,041	532,956	784,008	450,072	336,007	169,513
Total Cost	$ 372,595	169,890	0	0	31,057	274,686	246,543	205,351	287,802	139,218	125,186	54,637
Cost/cubic yard	$ .68	.14	0	0	.79	.34	.31	.39	.37	.31	.37	.32

**Disposal into Grassy Island Diked Disposal Facility.

*Lake Erie Sailing Course Dredged (Open Lake Disposal).

river. Extensive use has been made of the many islands for industrial and recreational purposes: on Zug Island there is a steel mill; Fighting Island and the northern end of Grosse Ile are disposal areas for wastes from caustic soda and soda ash manufacture; Grassy and Mud Islands are disposal sites for material from dredging operations; and Belle Isle and Bois Blanc Island are recreational areas.

B. Physiography

2.05 The terrain through which the Detroit River flows if fairly level, broken only by the valley of the Rouge River (on the Michigan shore) and the shallow valleys of lesser tributaries. Low morainic deposits and beach ridges of former lakes also exist. In its lower half, the Detroit River has gently sloping banks, is generally quite shallow, and varies in width between 2 and 4 miles. The bottom consists mainly of soil and boulders from a point below Grosse Ile to a point near the lower end of Fighting Island. Aquatic vegetation is abundant in the shallows of the lower Detroit. The upper half of the river has steep banks, a cross section less than 1/2 mile in width and depths ranging from 25 to 50 feet, and an earth bottom.

C. Hydrology

2.06 Each year the river rises and falls about 2 feet as measured by the monthly mean levels. Since 1900, there has been a difference of about 5 feet from the highest to the lowest monthly mean level. High easterly or westerly winds occasionally cause the raising or lowering of the water level in Lake Erie which significantly affects the level of the lower portion of the Detroit River; such changes have been as much as 6 feet within 8 hours. The highest wind velocity registered in the Detroit River area was 95 miles per hour (mph) from the northwest in June 1890.[3]

2.07 Water level fluctuations can also be traced to seasonal changes. The highest levels are predominant during the summer months, and the lowest levels are during the winter months.

2.08 The discharge of the Detroit River during a 75-year period of 1900-1974 has averaged 181,700 cubic feet per second (cfs). The lowest recorded mean monthly flow is 99,000 cfs in February 1942 and the highest is 231,000 cfs in August 1952. The river current generally varies from about 1-1/2 mph to about 4 mph.

D. Demography

2.09 The Detroit Area, part of a Standard Metropolitan Statistical Area (SMSA) that is comprised of Wayne County and portions of Oakland and Macomb Counties, has had an increase in population of 11.6% from 3,762,360

in 1960 to 4,199,931 in 1970.[4] Due to a decentralization trend, the city itself has declined 9.5%, while a 28.5% increase has been noted outside the central city. The majority of this increase is observed in Macomb County where an increase of 54.1% was determined.

2.10 In 1973, population for the City of Detroit was estimated to be about 1.4 million.[5] Census figures for Windsor show that the population in 1971 was 203,300.

2.11 About 71.9% of the population is employed, with the majority being employed in manufacturing. About 47% of those employed in industry are involved with motor vehicles and other transportation equipment. The mean, or average income in 1970 of a family in the Detroit SMSA was $13,532.[6]

2.12 The population of the area is anticipated to continue growing, but at a slower rate than has been demonstrated in the previous 20-year period. The growth will be primarily natural, with a small portion developing from in-migration.

2.13 Population projections, presented in Table C[7], were developed from activities of the Southeastern Michigan Water Resources Study - Economic Workshop Subcommittee. Sub-areas II and III cover the majority of the area from the Detroit SMSA and reflects the projection of the area (Figure 6).

TABLE C

POPULATION PROJECTION BY SUB-AREA, FOR SOUTHEASTERN MICHIGAN[7]

Sub Area	1970	1980	1990	2000	2010	2020
I	112,000	123,000	148,000	168,000	192,000	219,000
II	3,049,000	3,388,000	3,783,000	4,181,000	4,643,000	5,163,000
III	1,097,000	1,303,000	1,556,000	1,819,000	2,130,000	2,410,000
IV	265,000	362,000	444,000	539,000	645,000	758,000
V	164,000	181,000	199,000	226,000	253,000	281,000
Total	4,687,000	5,357,000	6,130,000	6,933,000	7,863,000	8,831,000

E. Waterborne Commerce

2.14 Commerce on the Detroit River consists primarily of iron ore, coal, limestone, farm products, nonmetallic minerals, metal products, cement, petroleum products, and manufactured goods.

2.15 The annual quantities of tonnage shipped through the Detroit River (excluding Canadian tonnage on the Detroit River) for recent years

is listed in Table D. During a 10 year period, 1965-1974, an average of nearly 110,000,000 tons of cargo per year is transported on the Detroit River.

TABLE D

DETROIT RIVER FREIGHT TRAFFIC, 1965-1974
ANNUAL QUANTITIES OF TONNAGE SHIPPED

Year	Detroit River*
1965	111,038,126
1966	116,528,490
1967	107,277,581
1968	109,301,075
1969	110,931,109
1970	112,847,955
1971	103,756,930
1972	105,933,334
1973	118,938,261
1974	99,615,134

*Excluding Canadian Tonnage, Computed from Waterborne Commerce (25).

2.16 A reduction in commerce was encountered by all lake ports during the 1974 navigation season and was attributed to world economic conditions, Canadian labor problems (labor strikes and pilotage disputes), and the disastrous ship/bridge collision in the Welland Canal. Total tonnage through the Detroit River was down 16 percent from 1973 to 1974.

2.17 For the seventh consecutive year and despite these problems, the Port of Detroit topped two million tons in overseas cargo. Imports and exports of general cargo continued to drop, reflecting the continued competitive impact of the land-bridge concept. Imports of steel dropped to under the million ton mark, whereas the export of U.S. steel increased from 1973 to 1974. This data is tabulated on Table E.

2.18 In 1974, the United States Customs Service reported collections of over $60 million, making Detroit the fourth largest revenue-collecting port in the United States.[26] According to the Port Commission, the tonnage values range from $25 to $30 per ton for general cargo, from $8 to $10 per ton for bulk cargo, and from $2.50 to $3.00 per ton for domestic cargo.

2.19 There are at present approximately four hundred carriers in the Great Lakes Fleet, including vessels of the United States, Canada and British registry. The greatest percentage of the fleet consists of ore and grain carriers, with tankers currently numbering about sixty. Railroad car ferries operate between Detroit and Windsor and are restricted by winter ice conditions.

TABLE E

Port of Detroit
Tonnage Report
1974 vs 1973[26]

EXPORTS	1974	1973
General Cargo	14,525	33,276
Steel	331,672	42,717
Bulk (dry)	210,219	459,165
Bulk (liquid)	34,404	36,845
EXPORT TOTAL	590,820	572,003
IMPORTS	**1974**	**1973**
General Cargo	60,878	109,320
Steel	993,570	1,358,252
Bulk (dry)	408,766	203,437
Bulk (liquid)	0	0
IMPORT TOTAL	1,463,214	1,671,009
TOTAL TONNAGE	2,054,034	2,243,012

- 188,978 or 8.4% decrease for year 1974

1973 Figures include International Great Lakes Terminal which is no longer in business.
1974 Figures include Consolidated Dock & Storage, a subsidiary of Wills Trucking, a private terminal handling primarily coke.

Compiled by: Port of Detroit Operators Association
Box 1643, Detroit, Michigan 48231

2.20 Shipping is dependent upon quantity of material needed to be transported and harbor depth. Varying water levels have an economic impact by controlling maximum cargo tonnage. Ships also utilize lake and river waters for cooling, ballast, and potable supply.

F. Recreation

2.21 The Detroit River is used extensively for recreational boating and fishing. Numerous marinas, launching sites, and public fishing sites are located in the area. Boating is an especially popular form of recreation in the region with a very high concentration of pleasure craft

in season. According to a study conducted in 1971, over one-fifth of the total small boat launchings in the entire State of Michigan took place in a ten-county area of Southeast Michigan. Boat registration for the State of Michigan indicates that approximately 574,700 pleasure craft are registered for the entire State. Of this number, about 28 percent are registered in the tri-county area of Wayne, Oakland, and Macomb counties (Wayne - 81,453, Oakland - 50,563, Macomb - 31,602).

2.22 In addition to the launching sites, there are other recreational areas, although these are sparse due to the industrial and residential utilization of the shoreline. The major shoreline recreation sites along the waters of the Detroit River are listed in Table F.

2.23 The river also provides a good summer fishery with trolling for walleye (Stizostedion vitreum) and shoreline angling for such species as yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieu), muskellunge (Esox mosquinongy), pike (Esox lucicus), bluegill (Lepomis machrochirus), sturgeon (Acipenseridae), white bass (Morone chrysops), and catfish (Ictalurus sp.). The area is also beginning to reap the harvest of the stocking program carried on by the Michigan Department of Natural Resources (MDNR). In 1974 and again in 1975, 300,000 chinook salmon (Oncorhynchus tschawytscha), 50,000 steelhead (Salmo gairdneri), were planted off the south end of Belle Isle; 100,000 chinook and 100,000 coho salmon (Oncorhynchus kisitch) were planted in the Huron River, just south of Detroit. In 1974, 20,000 brown trout (Salmo trutta) were stocked in the north channel of the lower St. Clair River, near Detroit.

2.24 The broad, lower reaches of the Detroit River are prime waterfowl-hunting areas. The availability of food in the shallow waters at the mouth of the Detroit River, especially around the many islands, attracts large populations of waterfowl at certain times of the year. The species of waterfowl sustaining the greatest hunting pressure are mallard (Anas platyrhynchos) and scaup (Aythya). About 1,000 scaup per square mile of open water have been shot annually in recent years in the area between Celeron Island and the Detroit River Light.

G. Waterfowl

2.25 Huge populations of waterfowl are prevalent during certain times of the year. The local breeding birds include such ducks (Anas sp.) as the mallard, black, and teal. Whistling swans (Olor columbianus) may be observed during the spring on the Detroit River, but are in lesser numbers (less than 3,000) than in the waters of western Lake Erie (3,000 to 6,000).

2.26 Within the Detroit River, numbers of many species of water birds are found, including herring gulls (Larus argentatus), ring-billed gulls

TABLE F

MAJOR SHORELINE RECREATION SITES

United States Sites	Location	Acreage and/or Description
Wyandotte National Wildlife Refuge	Detroit River	305. Two islands and adjoining shallows.
Pointe Mouillee State Game Area	Mouth of Detroit River	2,902. Managed for waterfowl. Also fishing, waterfowl hunting, boating.
Stony Point Park	Mouth of Detroit River	--
Estral Beach	Mouth of Detroit River	--
Elizabeth Park	Detroit River	162.0
Ecorse Park	Detroit River	--
Belle Isle Park	Detroit River	985.0
Several Parks within Detroit	Detroit River	450.0. Shoreline parks.
Canadian Sites		
Fort Malden National Historic Park	Detroit River	--
Several Parks Within Windsor	Detroit River	--

(Larus delawarensis), and terns (Sterna sp.). Large colonies of terns are found around Belle Isle. The concentration at Belle Isle has been so heavy that the water intake of the City of Detroit has in the past been plugged by the vast amount of waste products generated there.[5]

H. Water Quality

2.27 Between the headwaters and the mouth, the chemical characteristics of the Detroit River changes. Most parameters increase in concentration, especially from the influences exerted by the Rouge River and the Detroit Wastewater Treatment Plant.

2.28 During normal weather, the water quality in the Detroit River, from its head to the junction with the Rouge River, generally does not exceed the Water Quality Standards of the State of Michigan (Appendix C). During periods when precipitation exceeds about 1/2 inch, the combined sewer outfalls overflow the collection system and discharge contaminated stormwater and raw sewage.

2.29 In 1913, 1948, and 1962, studies were conducted for the International Joint Commission (IJC). Through the data obtained from these limited studies, some conclusions were drawn. During the period of 1913 to 1948, the water quality of the Detroit River continued to deteriorate as measured by coliform bacteria and phenols.[8] After the 1948 study, substantial progress in pollution control was observed, resulting in improved water quality between 1948 and 1962.

2.30 A comprehensive study was conducted in 1962 by the United States Public Health Service (USPHS) to determine the existing water quality. Several stations were established during this study and were continually monitored through 1973. This data is located in Appendix A and the sample station milepoints located on Figure 7.

2.31 Phenol concentrations have generally decreased, with the most significant reduction noted at milepoint 8.7W in the Trenton Channel. The near shore stations in the lower river (below milepoint 14.6) still exceeded the IJC goals of 2 ug/l average and 5 ug/l maximum. Ammonia nitrogen concentrations were relatively constant from 1967 through 1973. The nitrate concentrations increased at most milepoints since 1967, except 30.8W which remained constant.

2.32 Total phosphorus concentrations have decreased at all milepoints since 1968 with the most significant change noted at 8.7W; a reduction of about 36% was observed for the range with about 50% reduced at the near shore station. Total iron concentrations decreased at most stations and the largest reduction was found at the near shore stations in the Trenton Channel.

2.33 Dissolved solids data is limited to 1971-73, but all stations showed an increase. Although this parameter has been monitored only routinely for three years, the indication is that the levels are gradually increasing, although still within the standards as required in the water quality standards for the State of Michigan (Appendix C).

2.34 The results of statistically evaluating the mean annual values for 1968 and 1973 for the Detroit River are presented in Table G. Chlorides were observed to have decreased significantly at two stations, both relatively near the United States shore at milepoints 12.0W and 3.9. Iron concentrations also decreased at three stations on these two transects. The nitrate concentration was observed to have increased at three stations in the downriver region. The most important results were observed with respect to the phosphorus concentration which has decreased significantly at nearly all stations below milepoint 12.0W. No statistically significant changes were observed with respect to total coliform and ammonia nitrogen concentrations between these two years so they have not been evaluated.

2.35 In general, the water quality of the river has improved over the past ten years. The chloride, phenol, phosphorus, and iron concentrations have all decreased. The past four years have shown signs that the coliform levels may be dropping, although more time will be required to determine if this trend will continue. The decrease in concentration of these parameters appears to indicate that the industrial and combined sewer overflow control programs are beginning to have a positive effect on the river water quality.[8]

I. Bottom Sediments

2.36 Portions of the Detroit River - Trenton Channel, Amherstburg Channel and the Lower Livingstone-East Outer Channel - have been classified as polluted by the U. S. Environmental Protection Agency (see Figure 2). Pollution in the Detroit River and its entrance channels into Lake Erie is caused by contaminants in solution and suspension derived from untreated and partly treated domestic and industrial wastes; agricultural wastes deriving from fertilizers, pesticides, animal wastes, etc.; urban storm water runoff; and wastes from small craft and deep-draft ships using the waterway.

2.37 Studies were conducted in 1970[9] and 1973[1] by EPA on bottom sediments from the lower portion of the Detroit River to provide a general indication of the sediment quality and the acceptability for open water disposal. Another study was conducted for EPA in 1973 and 1974[8] to provide a preliminary characterization of the waters, sediments, and benthos. The data from these sediment studies is compiled in Appendix B and the sample points located on Figures 8, 9, 10 and 11. (DT refers to the Detroit River and the number is the milepoint measured from the mouth.)

TABLE G

DETROIT RIVER - STATISTICAL EVALUATION OF MEANS - 1968 VERSUS 1973[8]

DT River Mile	Distance from shore (ft.)	Chlorides	Phenols	Nitrates	Phosphorus	Iron
30.8 W	100	-	-	-	-	-
	300	-	-	-	1968 1973	-
20.6	50	-	-	-	-	-
	400	-	-	-	-	-
	1000	-	-	-	-	-
14.6	100	-	-	-	-	-
	400	-	-	-	-	-
	1000	-	-	-	-	-
12.0 W (Trenton Channel)	122	1968 1973	-	-	1968 1973	1968 1973
	490	-	-	1968 1973	-	1968 1973
	880	-	-	-	-	-
8.7 W (Trenton Channel)	80	-	-	-	-	-
	480	-	-	-	1968 1973	-
	980	-	-	1968 1973	-	-
	1240	-	-	-	1968 1973	-
3.9	2500	-	1968 1973	-	1968 1973	-
	5500	1968 1973	-	-	-	-
	7500	-	-	1968 1973	1968 1973	-
	9500	-	1968 1973	-	1968 1973	1968 1973
	11500	-	-	-	1968 1973	-
	15000	-	-	-	1968 1973	-
	16500	-	-	-	-	-
	18500	-	-	-	1968 1973	-
	19300	-	-	-	1968 1973	-

2.38 The Detroit River sediments, from the data gathered and when compared to the EPA criteria (Appendix D), show substantial enrichment in total phosphorus, total kjeldahl nitrogen, chemical oxygen demand (COD), as well as cadmium, chromium, copper, lead, zinc, and iron along the United States shoreline. Minor increases of nickel were found in 1974 at stations 13 and 19 on milepoint ranges DT 16.0W and DT 3.9 respectively. The United States stations are generally higher than corresponding Canadian stations and do not show any major changes in the amount of manganese, with the exception of station 10 on milepoint DT 19.0, just below the mouth of the Rouge River. Sediments at stations 13 (DT 16.0W) and 20 (DT 3.9) were only slightly higher than the background concentrations.

2.39 United States shoreline stations at milepoint ranges DT 19.0, DT 16.0W, and DT 3.9 were found to be major zones of deposition for most of the parameters investigated. Only one Canadian station (12) at milepoint range DT 17.0E showed somewhat the same characteristics, especially with respect to the toxic heavy metal, mercury.

J. Biology

2.40 The benthic communities of the Detroit River, although influenced by current velocities, give evidence of major pollutional conditions, particularly in the downstream areas. The upstream area is characterized by the presence of clean water or faculative forms, whereas the area about a mile below milepoint range DT 19.0 for about 6 miles is populated by pollution-tolerant organisms. A limited recovery of the benthic fauna exists from an area about 9 miles from the mouth downstream to Lake Erie. The phytoplankton community shows considerable variation with season, area, and location although a slight increase in number of individuals is found in the downstream region.

2.41 The upper river (DT 30.8 and DT 30.7) shows an area unaffected by major pollutional sources (Figure 12). From the headwaters to about milepoint DT 20.6, there is an increased degradation of the benthic community. An abrupt change is noted at DT 19.0, just below the junction of the Rouge River. The benthic communities for about the next 7 miles are severely limited, having a predominance of more than 70% tolerant species. The areas downstream along the shoreline of the United States have high levels of tolerant benthic forms that are generally insensitive to a variety of environmental conditions. About 12 miles from the mouth of the river, a natural recovery begins, although this process is faster along the Canadian shore (Figure 13). Due to shifting bottom material, the range of DT 3.9 finds the area further from shore being the more polluted.

2.42 The macrobenthonic community of the upper Detroit River is relatively healthy and diverse. At the confluence of the Rouge River, the river benthos is affected by the industrial and municipal discharges and results in very high numbers and percentages of forms tolerant to environmental stress.

2.43 Phytoplankton. Phytoplankton populations are probably more important in terms of their potential rather than their present development. Species richness, diversity, and similarity support the findings that the Detroit River is not greatly different in phytoplankton populations from the upstream to the downstream areas. The concern of the Detroit River and its phytoplankton population is its potential to produce "bloom" conditions of nuisance algae in Lake Erie.

K. History and Archaeology

2.44 The National Register of Historic Places has been consulted and subsequent issues of the Federal Register checked. The National Register of Historic Places includes many properties in Wayne and Monroe Counties. However, only a few of these places are in close proximity to the Detroit River. These are Belle Isle, located near the head of the river; old Fort Wayne, situated near the river bank just downstream from the Ambassador Bridge; the East River Road Historic District, located on the east shoreline of Grosse Ile in the lower sector of the river; and a potential candidate for Natural Landmark designation, Celeron Island, located astride the mouth of the Trenton Channel. None of these sites are within the channel dredging limits. The Michigan State Historic Preservation Officer has been consulted and has concluded that the maintenance will have no effect on cultural resources.

L. Rare, Threatened and Endangered Species

2.45 No rare, threatened, or endangered species have been identified,[27] although the White Cat's Paw Pearly Mussel may be threatened or endangered. According to the Federal Register, Vol. 39, No. 202, a thorough review is being conducted by the U. S. Fish and Wildlife Service to determine its status.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 Present land-use patterns, as developed by the Southeastern Michigan Council of Governments (SEMCOG) show the major portion of the region's area as agricultural. A rapid change has been taking place in that the agricultural and open-space lands are being developed for urban use. It is anticipated that during the next 20 years, new urban developments in the Southeastern Michigan region will require approximately 1,100 square miles, the major portion of which will come from agricultural land. By the year 2020, projections indicate the total urban and developed area will nearly double (Table H).

TABLE H[11]

PROJECTED LAND USE
SOUTHEASTERN MICHIGAN
(1,000s of Acres)

Land Use	1970	1990	2020
Urban and Buildup	830	1,230	1,746
Agriculture	2,300	2,000	1,618
Forest and Other	850	750	616
Total	3,980	3,980	3,980

3.02 Despite the concentration of commercial and industrial developments along its shoreline, the Detroit River still provides a valuable recreational release for countless thousands in the Metropolitan area, whether cruising over its waters in an expensive yacht or merely sitting on the river bank watching the freighters go by. Major recreation sites on the river include the Wyandotte National Wildlife Refuge (305 acres), Pte. Mouillee State Game Area (2,902 acres), Elizabeth Park (162 acres), and Belle Isle Park (985 acres). There are approximately 450 other acres of shoreline parks in several parcels within the City of Detroit covering about 8,700 feet of river shoreline.

3.03 Draft Environmental Statements were sent to eight planning agencies for an evaluation of the maintenance dredging operations for the Detroit River navigation channels. Ten local governments were also requested to review the document.

3.04 The Planning Department of the City of Detroit indicated no serious objections to the proposed dredging operations on the Detroit River, nor do the dredging operations conflict with any policies, plans or programs of the City of Detroit. A review conducted by the Southeast Michigan Council on their planning efforts indicates that the proposed work does not fall directly within the scope of any adopted plans or planning work underway. Copies of their letters expressing these views are included in Appendix F, Letters of Coordination.

3.05 The Southeast Michigan Council of Governments (SEMCOG) reviewed their planning efforts and indicated that the proposed maintenance operations does not fall directly within the scope of any adopted plans or planning work underway.

4. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

A. Identified Physical Impacts

4.01 Water Quality. (The water quality standards of the State of

Michigan, indicated in Appendix C, do not apply to dredging activities.) Implementation of the proposed maintenance dredging operations for the removal of the polluted material will result in the following impacts:

(1) increased water turbidity due to the suspension of bottom sediments caused by removal, hopper bin overflow, and disposal operations. Increased turbidity tends to restrict the light penetration that is necessary for photosynthesis for organisms and for aquatic flora.

(2) reintroduction of the nutrients into solution or suspension from anaerobic sediments.[13] These additional nutrients would be available for aquatic plant growth until oxidation of the reduced nutrient forms occurred, thus removing the nutrients by natural chelation or incorporation into organic matter. The amount of phosphorus possibly released from the sediments would be insignificant compared to the estimated 7,270 tons of phosphorus contributed to the Detroit River from U. S. and Canadian tributary, industrial and municipal sources.[14]

(3) release and relocation of toxic metals and grease and oil now lying in the river and lake bottom sediments due to the disturbance of these materials by the removal work. Reintroduction of micro-toxic heavy metals (Ca, Fe) from sediments is being studied for the Waterway Experiment Station by the University of Southern California. The amount released into solution has been reported as insignificant to be harmful to aquatic life. Preliminary data involving reintroduction of macro-toxic heavy metals (Zn, Hg) is inconclusive at the present time.

(4) resuspension of organic substances, chemicals and other high oxygen demanding substances reduces the amount of dissolved oxygen in the water. Resuspended organics tend to reduce the oxygen levels from 16 to 83 percent, due to high initial oxygen demand.[12]

4.02 Implementation of the proposed maintenance dredging operations for the removal of the unpolluted material will result in the following impacts:

(a) increase water turbidity due to the suspension of bottom sediments caused by rock-removal and disposal operation.

(b) release and relocation of nutrients now lying in the river and lake bottom sediments due to the disturbance of these materials by the removal work, and

(c) re-suspension of organic substances, chemicals and other high oxygen demanding substances reduces the amount of dissolved oxygen in the water.

4.03 Since the action described previously entails the removal of hard obstructions, principally rock, in hard bottom channels, turbidity

should be minimal because there would be little sediment in these areas to be resuspended. Discernible turbidity and oxygen demand should disappear within a relatively short distance downstream.

4.04 Overall nutrient levels should not be increased by this maintenance operation. The movement of the current and large volume of water down these channels would probably effect a dilution of nutrients rather than a settling of nutrients to the river bottom. Much of the river flow is concentrated in the shipping channels, and any suspended solids would be carried great distances and dispersed over a wide area as the river flow spreads out into Lake Erie.

4.05 Any adverse impacts on water quality would be confined to the immediate work area, should be minimal in degree, and of no consequence to the prevailing water conditions.

4.06 Erosion Effects. The removal action itself would have no influence on erosional processes. However, much of the material that is removed by derrickboat (grab dredge) would be placed on existing project dikes to repair previous erosional damage from storm and ship wave action. Some movement of the finer sediments out of the deep water disposal sites can be expected as a result of wave motion over the areas. As a major portion of these dredgings will consist of rock, the release of sediments from the disposal areas should be minimal. The hopper dredged material will be placed into the proposed CDF upon construction, so no release of sediment is anticipated.

4.07 Littoral Drift Effects. Accretion and erosion along points of the river shoreline are natural phenomena. The Detroit River shore and banks have undergone so much alteration - particularly on the American side - that there are few natural features remaining. A report conducted for the Wayne County Road Commission in 1955 and one conducted by the Federal Water Quality Administration[24] indicated that sediment-laden waters follow a course close to the shoreline in this system. With the proposed maintenance and disposal operations taking place some distance off-shore, there is little prospect of influencing littoral processes.

4.08 Effects on Flood Stages. There would be no measurable influence on water level stages from the dredging operations.

4.09 Dredging Overflow Effects. Another area of concern is the impact of the overflow from the hopper bins. The overflow is to allow the excess water and sediment to be discharged until a predetermined, economic load is attained. The normal hopper dredge procedure is to continue loading for a brief time after initial filling, although every effort is exerted to minimize any adverse effect. The length of time pumping continues after filling is dependent upon the settling characteristics of the material and distance to the disposal site. The Buffalo District, from their 1968 dredging study[17], indicated that at most Great Lakes harbors, an economic

load requires pumping for a little less than twice the time for initial filling. From other studies conducted by the Corps and the Environmental Protection Agency, overflow from hopper bins created the most severe pollution in the immediate vicinity of the dredge. The levels of the contaminants decreases substantially at lower levels in the water column and even moreso at distances downstream.

4.10 During dredging operations, the Corps will follow the recommendations from the Environmental Protection Agency in order to minimize any adverse effects from these operations:

(1) Excavate, dredge, or fill in the watercourse so as to minimize increases in suspended solids and turbidity which may degrade water quality and damage aquatic life outside the immediate area of operation.

(2) Investigate for water supply intakes or other activities which may be affected by suspended solids and turbidity increases caused by work in the river, and give sufficient notice to the owners of affected activities to allow preparation for any changes in water quality.

(3) Assure that deposition of dredged or excavated materials on shore, and all earthwork operations on shore will be carried out in such a way that sediment runoff and soil erosion to the watercourse are controlled and minimized. Spoil materials from watercourse or onshore operations, including sludge deposits, will not be dumped into the watercourse. Place all dredged or excavated materials on upland property in a confined area to prevent the return of polluted materials to the river by surface runoff, or by leaching.

(4) Assure that upon completion of earthwork operations, all fills in the watercourse, or on shore, and other areas on shore disturbed during construction will be seeded, riprapped or given some other type of protection from subsequent soil erosion.

(5) Take special care to avoid any spillage of oils, fuels, or any other types of pollutants while working within or along the banks of the waterway. Specific plans should be formulated in advance of construction to contain such spills in the event of any contingency.

B. Identified Biotic Impacts

4.11 Effects on Aquatic Biota (fish, benthic organisms, etc.). Major effects from the proposed action would be the:

(1) displacement of the fish population and disruption of the aquatic food chain due to the stirring of the water in the work areas.

Fish generally avoid the immediate dredging area until dredging operations are completed. Some suspension of sediments can occur around the perimeter area of the disposal sites during disposal operations, disrupting feeding grounds of fish and bottom dwelling organisms that exist in the immediate area, although this is not anticipated since there are precautions taken to eliminate spillage during pumpout and to avoid turbid overflow from the disposal facility.

(2) smothering of the benthic organisms at the open water disposal site by the materials dredged from the unpolluted areas of the project area. After termination of the disposal activities, the surviving organisms will begin recolonization. A temporary turbid condition occurs at the site when the material is released through the bottom doors. Suspended solids reduce the light penetration and, if a sufficient light loss occurs, the life cycle of certain organisms could be adversely affected.

(3) removing the non-polluted sediment capable of providing desirable habitat for aquatic fauna and flora. Removal of the existing bottom habitats for fish and benthic macro-invertebrate communities will also result from dredging. Benthic communities can be expected to be subjected to smothering from sedimentation which accumulates. Recolonization of these areas would generally be dependent on the species' nature, the mobility of organisms inhabiting the affected areas, and the subsequent type of substrate.[15] Although benthic organisms will recolonize, the species diversity would have a tendency to be changed. The non-mobile species and the temporarily displaced mobile organisms that inhabit the dredging areas will be continually removed. Plant and animal life dependent upon this area will also be destroyed. In areas where annual dredging occurs, the species composition may never reach a true balance, and maximum sustained population density may never be attained.

(4) possible improvement of the quality of harbor-bottom habitat in the polluted areas by removal of the degraded sediments.

4.12 No rare, threatened, or endangered species have been identified by the U. S. Department of the Interior as being within the dredging or disposal areas. Therefore, there will be no impacts on the biotic community from the proposed maintenance dredging operations in this respect.

4.13 Effects on Terrestrial Biota (wildlife, vegetation, etc.). Disposal of a portion of the dredged material will be onto the existing compensating dikes which were established with the construction of the navigation project in the lower Detroit River. Completely surrounded by water, these dikes have become popular bird habitat, primarily for gull species. During operations the birds will migrate to a less active area, but will return when this action is completed. This disruption of their habitat is a short-term effect as evidenced by their continued presence on the dike structures after years of annual disposal.

4.14 Overall Ecology. Bottom fauna varies according to natural characteristics of a body of water, such as depth, temperature, and type of sediment. Although relatively limited data exists on the invertebrate population of the Detroit River, the information assembled indicates that invertebrates form a valuable part of the diet of waterfowl and fish, and that kinds and quantities of invertebrates in an area are useful as indicators of pollution.

4.15 In the lowest portion of the Detroit River, a study conducted in the late 1950's found a benthic climax community typical of large rivers.[5] The area appeared to be generally suitable for aquatic invertebrates. Not all areas within the lower Detroit River were, however, equally suitable. Clean-water species, such as mayfly and damselfly nymphs and various crustaceans, were collected frequently in the Livingstone Channel. However, no mayfly nymphs were collected in the Trenton Channel (an area closer to sources of pollution), although certain members of the order crustacea, animals somewhat tolerant to pollution, were found on the cleaner side of this channel near Grosse Ile. Cursury investigations of the lower part of the Rouge River, an extremely polluted area, showed it to be devoid of animal life.[8] Hence, there was 20 years ago a gradual change in benthic fauna, varying in direct proportion to the degree of pollution. Another study (1965), in examining the changes which occurred in western Lake Erie's benthic fauna over a 31-year period,[5] found a sharp decrease in clean-water invertebrates (e.g., the burrowing mayfly) and a great increase in oligochetes (e.g., tubificids) and gastropods (e.g., water snails), types tolerant to pollution.

4.16 Given the steady growth in population and the spread of industry along the Detroit River, the situation has undoubtedly changed even more since the time of these two studies. The data from these reports indicate that the benthic population and species are primarily controlled by the degree of contamination existing in these water bodies. The change in these primary food sources has, of course, led to a transformation in the types of higher animal life.

4.17 The dredging of hard obstructions in the navigation channels of the lower Detroit River is widely scattered and of little concentration. These areas do not provide an attractive habitat for aquatic biota, so their presence is scarce. Consequently, the impacts from derrickboat maintenance operations in the rock channels would be expected to have little influence in determining the population characteristics of the aquatic and terrestrial biota inhabiting the Detroit River system. The polluted sand and silt material that forms the shoal areas is generally found along the channel edges in the lower part of the Livingstone Channel and the East Outer Channel. Aquatic biota found here are pollution tolerant and in dense numbers. Impacts from hopper maintenance operations will cause a disturbance of the biota and will result in temporary turbid conditions which may alter the remaining communities.

4.18 Many areas in the lower Detroit River are popular sport fishing and waterfowl hunting grounds, but the maintenance operation would have minimal adverse impact on these activities. This is best evidenced by the fact that such maintenance work has been proceeding for many years without impeding the growth of recreational activities. In fact, subsequent events have shown that the rocky reefs and shoals formed from the disposal of such materials have enhanced fish habitat and stimulated fishing activity for sport and commercial interests. No harmful effects on water quality have been identified from open-lake disposal of unpolluted materials, although short-term, adverse impacts on the fishing activities and the aquatic invertebrates are anticipated.

C. Identified Social Impacts

4.19 Aesthetics. The project of establishing the existing navigation channels in the Detroit River was initiated with the River and Harbor Act of 1902 and expanded upon by subsequent Acts through 1968. Maintenance dredging has been an ongoing, periodic operation during those years and can be considered "part of the scene" along this waterway. Most of the project work occurs far removed from shoreline areas and is little noticed except by fellow mariners. An odor problem can be associated with disposal operations into a CDF and possibly onto the project compensating dikes. A steady pumping noise during disposal operations is audible about 2,000 feet away but is generally not bothersome.

4.20 Economic. The Detroit River system is a link in the channels connecting the transportation routes of the lower Great Lakes with those of the upper Great Lakes. The economic impact of not dredging could be quite adverse. In the shoaling areas, a vessel would run aground and a delay would result in freeing the vessel from the sand and silt. A grounding in rock bottom channels usually causes considerable hull damage as well as affecting the safety of the vessel. Reduced vessel drafts, to avoid such a possibility, would mean reduced cargoes and consequently higher unit prices for cargoes carried.

4.21 Public Interests. Maintenance of this waterway for the safe passage of deep-draft vessels is clearly in the public interest. As discussed in paragraph 4.20 above, failure to maintain adequate navigation depths could bring adverse economic consequences on the consuming public as well as the shipper. The Detroit River is an International waterway. A large percent of the maintenance of the channels being considered here lies in Canadian waters, but is maintained by the Army Corps of Engineers as a result of International agreements. Failure to maintain these channels could have International impact.

4.22 Remedial and Mitigative Measures . During normal maintenance dredging operations, every effort is made to minimize or deter any adverse effects. The inconvenience encountered by local pleasure craft operators

can be alleviated through advance notice to the public (public notice publication; notices posted at marinas, sports shops, harbor and docking facilities, yacht clubs; information published in local mariners' magazines and newsletters), schedule changes to avoid conflict with major harbor activities, and provision by the U. S. Coast Guard of navigation aids to designate the working area.

4.23 Disposal at the open water disposal area will be conducted while the dredge is stationary, in order to eliminate most of the turbidity plume created during disposal. No polluted materials will be disposed of at the open water location (unless the material has been determined as marginally polluted and will be covered with non-polluted materials), and only the specified area will be utilized.

4.24 Historical and Cultural Resources. The environmental statement has been reviewed by the Environmental Review Coordinator for the State Historic Preservation Officer. It has been concluded that the maintenance dredging operations will have no effect on the cultural resources. The historical and archaeological properties were discussed in Section 2L, and are not located within the project limits. Should archaeological sites be discovered during the operations, authorities will be notified and the area not disturbed.

4.25 Environmental Effects. The proposed maintenance dredging of the Detroit River Federal navigation channels will result indirectly in social and economic benefits to the area. Restoration of authorized controlling project depths can maximize shipping cost economics through more effective utilization of the Great Lakes cargo fleet. Section 122 of Public Law 91-611 presents possible areas of impact that should be considered in relation to the proposed operations. These areas include, but are not limited to:

Noise	Regional Growth
Displacement of People	Business/Industrial Activity
Community Cohesion	Displacement of Farms
Community Growth	Man-Made Resources
Tax Revenues	Natural Resources
Property Values	Air Pollution
Public Facilities	Water Pollution

During the ongoing planning for the proposed maintenance operations, these aspects were evaluated. The proposed action will have negligible effect on existing air quality and noise levels adjacent to the shorelines.

4.26 The climate, physiography and topography, geology, and soils are not affected by the project, but rather have an impact on the project. The climatic conditions dictate the time of year that it is feasible to dredge the channels. Plants growing along the shorelines are not threatened nor endangered. No rare, threatened, or endangered species inhabit the dredging or disposal sites. Because of their mobility, the

huge populations of waterfowl prevalent during certain times of the year will not be affected by the maintenance operations.

4.27 It is anticipated that the proposed activity will have little, if any, significant effects on patterns of living already established in the areas outlined above.

5. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

5.01 Despite efforts to eliminate or reduce any adverse impacts from maintenance dredging operations, certain adverse effects cannot be avoided. In the dredging area and at the open water disposal site, rooted aquatic vegetation and benthic organisms will be destroyed, removed, or suffer habitat changes in which they may not survive. In areas where dredging is performed annually, the species diversity may be reduced, and the species composition may never reach a true balance. Due to the dredging operations, it is anticipated that there will be some temporary, minor interference to shipping or local recreational and commercial boaters who will be inconvenienced by having to avoid the dredging area as well as the path the dredge travels to the disposal site. Additional short-term, minor effects might be the noise caused by the pump motors or the odors from the release of gaseous pollutants into the air. Temporary turbid conditions occur at the dredging areas, due to the operation of the drags and the hopper overflow, and at the open water disposal site during the release of the unpolluted material.

5.02 During this short period of time, the turbid conditions in the water column will result in a decline in the water quality. This is indicated by reduced transparencies, slightly lowered dissolved oxygen levels, and increased concentrations of nutrients and solids.

5.03 Generally, maintenance dredging operations cause annual periodic, short-term, localized problems attributed to turbidity, suspended solids and sedimentation. During dredging, nutrients and heavy metals will be released from the sediments where they have been in a stable, non-reactive status. Water quality and nektonic, planktonic, and benthic habitats will also be adversely affected. However, the benthic organisms can recolonize after dredging ceases. Fish species ordinarily tend to avoid the dredging area and open water disposal site until operations cease.

5.04 Due to the amount of activity associated with the recreational and commercial navigation in the Detroit River, some temporary periodic interference is likely to occur. The presence and operation of the dredging equipment may possibly result in a brief delay in the operation of small craft and deep draft shipping. The employment of a hopper dredge for removal of the shoaled material minimizes disruptions to navigation. The use of the derrickboat for this project affects a relatively small part of the overall river system leaving areas of the waterway still a viable habitat for fish, waterfowl, and the recreational boater.

5.05 The dredging operations will be conducted so as to minimize the adverse effects attributed to maintenance. When the dragarms are lowered and dredging commences, the dragtenders try not to disturb the bottom sediments until dredging starts. Every attempt is made to obtain an economical load without excess overflow from the hopper bins. At the disposal facility, care is taken so that spillage is not encountered during hook-up or pumpout, and when pumpout is completed, the dredge washings are also pumped into the disposal facility.

6. ALTERNATIVES TO THE PROPOSED ACTION

6.01 The proposed action involves the continued maintenance dredging of the connecting channels of the Detroit River which connect Lake Erie with Lake St. Clair by the U. S. Army Corps of Engineers as authorized by Congress. This involves: the annual maintenance by derrickboat to remove the hard obstructions from the Federal navigation channels; periodic (as needed) maintenance by hopper dredge of the Lake Erie Sailing Course with disposal into the deep water disposal site; and future annual dredging by hopper dredge of the polluted materials from the navigation channels with disposal into the Pointe Mouillee CDF.

6.02 Alternatives to the proposed action can be separated as dredging alternatives or disposal alternatives.

A. Dredging Alternatives

6.03 Four (4) alternatives can be considered under this category: 1) alternative dredge types, 2) discontinue maintenance dredging, 3) dredge to a lesser depth, and 4) wastewater management.

Alternative Dredge Types[1]

6.04 The type of dredging equipment and the method used to accomplish the most economical and efficient dredging depends upon several factors:

(a) composition of the material to be dredged;

(b) dredging depth;

(c) transportation distance from dredging site to disposal location;

(d) availability of dredge, and

(e) the capability of the selected dredge to minimize further pollution during the operations.

6.05 Dredging equipment is classified as either mechanical or hydraulic. The various types of mechanical dredges are: backhoe, dipper, dragline, ladder, and grab. The hydraulic dredges operate a suction line through which material is pumped. The types of hydraulic dredges are plain suction, pipeline-cutterhead, and hopper.

6.06 Mechanical dredges are usually mounted on floating barges. The rate of sediment removal is slow compared to hydraulic methods and disposal is normally accomplished by placing the sediment on barges for hauling to disposal sites. Increased barge traffic may interfere with navigation and work operations may halt during periods of rough seas. These mechanical methods of sediment removal are good for small jobs in confined areas, close to navigational structures, and for removal of compacted sediments.

6.07 The hard obstructions in the Detroit River are removed by derrickboat (grab dredge). The advantage of this type of dredge is that it can be used extensively around docks, piers, and especially in the corners of cuts where it can maneuver without causing damage to structures. It is suited to working in silts and stiff mud, and can be very effective in removing obstructions and trash. The dredging depth of this dredge plant has been described as practically unlimited.(2)

6.08 A grab dredge does not do very well in hard material and is not suited to stiff and hard clay since the bucket's weight does not have enough penetrating power to get a full load. The channel is left with an irregular bottom and this makes it difficult to dig to a specified depth. Cost for bottom mud removal can range from $.60 to $10.00 per cubic yard.

6.09 A hopper dredge is utilized for maintenance of the Lake Erie Sailing Course and is proposed as the dredge type to remove the materials from the sections of the river classified by the U.S. EPA as polluted. There are many advantages to the hopper dredge equipment. Dredging depths can be from 10 feet by the smallest hopper dredge up to and beyond the depths required for the deep depth vessels. While in motion, a hopper dredge is capable of dredging or bottom dumping. Some of the other advantages for utilizing the hopper dredge for maintenance are: it is efficient in removing a thin layer of sediment covering extensive areas; it is a self-propelled and self-contained dredging plant; it does not generally interfere with or obstruct navigation during operations; and dreddging is accomplished by successive shallow cuts, as usable channel improvement is accomplished and the depth is progressively increased as work continues. This method is also less conducive to residual shoaling during the dredging operations than other methods of dredging. The disadvantages of hopper dredges are summarized as follows: the turbidity is temporarily increased due to the disturbance caused by the drag and the overflow from the hopper bins; the dredge must dock in order to accomplish pumpout operations, which is a loss of valuable dredging time; and type of materials dredged is limited to silts, sands, gravel, organic matter, certain clays and stone, and objects that can pass through the dragheads.

6.10 Strict cost comparison of different dredge removal operations can be misleading. Each type is best suited for a particular job. Location and amount of work, sediment type and disposal method affect costs, so this information must be taken into consideration prior to decision making.

6.11 Based on the authorized project dimensions and status, equipment available, and requirements, the most efficient and economical dredge types for this maintenance was the hopper dredge for the removal of the polluted sediments and the derrickboat (grab dredge) for the hard materials. The other types were no longer considered and are summarized on Table I.

Discontinue Maintenance Dredging (No Action) [2]

6.12 The necessity for this maintenance dredging arises principally from natural shoaling of the connecting navigation channels due to transport of sediments by currents. Once a navigation channel is dredged, it tends to be deeper than the remainder of the waterway and sediments tend to be deposited within the channel. This deposition must be periodically removed in order to maintain the authorized depth of the channel.

6.13 The usable draft within a navigation channel is dictated by the highest shoal. An accretion of sediment anywhere in the channel may therefore render the channel unusable, even though the authorized depth may be maintained elsewhere in the channel.

6.14 This alternative would jeopardize international as well as national commercial shipping and would eventually hamper other navigational activities. Consequently, individuals and enterprises dependent on this mode of transportation for their livelihood would suffer economically. Many goods which rely on inland navigation for transport are too heavy or too bulky to be efficiently transported by other means. The entire economy of the Great Lakes area is largely dependent, directly or indirectly, on the availability of efficient low-cost transport of raw materials and finished products by water through the navigation channels.

6.15 The discontinuance of dredging will not affect the pollution loading of the area. Only a reduction of contaminant impact from industries and municipalities, urban storm water runoff, wastes from small craft and deep-draft vessels, and agricultural wastes will improve sediment quality.

6.16 Due to the potential large-scale deterioration of both the natural and the human environments which would result from the no-action alternative, it was not given further consideration.

TABLE I

Evaluation of Alternative Dredge Types

Mechanical	Advantages	Disadvantages
Backhoe	Penetrates bottom independent of bucket-weight Short operating cycle Flexible General availability of spare parts	Limited dredging depth Limited bucket size Rough channel edges left Limited backwards dredging direction
Dipper	Equipped with power operated dipper stick that can maneuver the bucket forward, vertical & horizontal Useful for new work and breaking up compacted material	Leaves rough channel bottom Excessive time required for clay removal
Dragline	Special bucket is placed, via long boom, into area to be dredged	Limited dredging depth Much material lost during excavation Uneven channel bed left
Ladder	Dredges while being moved via anchor lines	Low efficiency Lacks stability when in tow Poor mobility Not designed for rough water Mooring and anchoring lines are hindrance to navigation
Hydraulic		
Plain Suction	Can transport over short distances mainly for removal of free flowing material	Simplest form Limited materials that can be handled
Pipeline-Cutterhead	Very versatile in type of material handled Usually contain own power unit	Floating discharge line from dredge to land disposal Limited dredging depth

Dredging to a Lesser Depth(3)

6.17 This alternative would have a similar effect as the above project proposal. Shoaling reduces efficient shipping. Even a small reduction in available draft means a major reduction in cargo per vessel voyage. For example, a one-inch reduction in available draft reduces the effective cargo-carrying capacity of the average lake freighter by 100 tons.[16]

6.18 Decreased effeciency of transportation results in increased costs and prices throughout the industrial, commercial, and household sectors of the economy. The net effect of reductions in draft is a reduction in commerce and in the industrial activity dependent on commerce.

6.19 This alternative would also result in large-scale deterioration of both the natural and human environments so this alternative was not given further considerations.

Wastewater - Management(4)

6.20 Both Federal and state laws require improvements in the wastewater treatment facilities, which could be expected to reduce concentrations of BOD, COD, total solids, nitrogen, phosphorus and heavy metals. Since the Corps lacks authority concerning stormwater and wastewater treatment facilities, this alternative was not considered more favorable than the proposed plan.

B. Disposal Alternatives

6.21 Five (5) alternatives are discussed as possible alternatives for disposal: 1) all material confined; 2) all material disposed in open water; 3) deep (over 100 feet) water disposal; 4) land disposal; and 5) pretreatment of material. In terms of economics, practicality, irretrievable resources, and minimal ecological disruption, the process of confined dike disposal for polluted sediments and open water disposal for non-polluted sediments offers the best solution at the present time.

All Material Confined(1)

6.22 Disposal of all dredged material to confined disposal sites would necessitate the creation of additional diked disposal areas. At present, some of the unpolluted material (hard obstructions) removed by the grab dredge is disposed of onto the compensating dikes (Appendix E). Disposal sites for material along the Detroit River are at a premium due to the present usage of the land, and the Corps inability to find disposal sites that are acceptable to state agencies, private groups, and the general public. Because of the degree of development, this area has a scarcity of shoreline available for use as disposal areas, so this action was not considered as a more favorable alternative.

All Open Water[2]

6.23 Open water disposal of polluted sediment would conflict with a request made by the Governor of Michigan to discontinue disposal of polluted dredge material in the open lake water. The Environmental Protection Agency has stated that polluted sediment is unsuitable for open lake disposal. The Corps operates under Code 33CFR 209.145(b)(1) governing open water disposal of polluted sediments. Studies are underway at the Waterways Experiment Station that should support this policy or indicate the disposal method is not detrimental.

6.24 Because of the expressed wishes of the Governor, the procedures contained in the Code of Federal Regulations, and the potential adverse environmental impacts associated with this procedure, this alternative was not considered practicable.

Deep Water Disposal[3]

6.25 The alternative of discharging non-polluted sediments to open water areas 100 feet deep or deeper has been suggested to diminish disruption of the ecological system. To reach waters of this depth would involve a trip of over 110 miles one way from the lower Detroit River to a location in Lake Huron, the closest point for such water depths. The greatly increased costs (10X or more) to accomplish this type of operation are not substantiated by any perceived benefits. This still presents potential adverse environmental impacts and is contrary to the position of the Governor of Michigan, so such action was not regarded as a more favorable alternative.

Land Disposal[4]

6.26 Land disposal requires an inland discharge area and pipeline or other means of conveyance. Inland disposal sites are relatively scarce, normally privately owned and being used for solid waste disposal. It is a Corps policy to secure the maximum practicable benefits through the utilization of materials dredged from authorized navigation channels and harbors, provided extra cost to the Government is not incurred. Access to disposal pumpout facilities would normally require a new channel and turnaround area for the hopper dredges. Utilization of marsh areas for sediment disposal is ecologically unwise and the process of long distance pumping has economical, engineering, and logistical drawbacks. Several studies are being conducted for the Waterways Experiment Station on the environmental impacts associated with upland and marsh disposal, research on disposal sediment reuse, creation of islands and artificial marshes, and similar research on artificial habitat development. However, results from these studies are not yet available for consideration.

6.27 The unavailability of potential disposal sites precludes further consideration of this alternative. For more detailed information concerning the search for upland disposal sites, refer to the Final Environmental Statement, Confined Disposal Facility at Pointe Mouillee for Detroit and Rouge Rivers, March 1974.

Pretreatment[5]

6.28 Treatment of dredge material can be accomplished in many ways: (1) local sewage treatment works; (2) separate onshore treatment plant; and (3) on-board treatment prior to in-lake discharge.

6.29 A small hopper dredge removes about 5,000 cubic yards per day of material. A 0.5 percent slurry of that amount would be a volume equivalent to the wastewater discharge of 1.2 million people,[17] and existing sewage treatment plants do not have the capacity to treat these additional volumes. Costs for new treatment plants are prohibitive and chemical treatment to settle the suspended solids is expensive. In addition, chemical flocculation in conjunction with open lake disposal could cover lake bottoms with sediments completely unsuitable for biological production.

6.30 In order to utilize separate onshore treatment plants, storing, handling, and transporting problems must be addressed and evaluated. These additional steps would increase the costs by as much as an estimated 10 percent.[7] The most efficient and effective system would first require the removal of larger particles, then thickening the remainder by storage to a concentration of 45 percent solids. Costs increase rapidly with reduction in the percentage of solids.

6.31 On-board chemical treatment is technically feasible but is economically unrealistic when considering the volume that must be removed. Space requirements for complete treatment equipment and the increased costs involved removed this alternative from further consideration.

7. RELATIONSHIP BETWEEN SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 In order to evaluate the environmental relationships that can be expected to occur as a result of implementing operation and maintenance activities on the Detroit River, the following definitions have been applied:

a. "Local short-term uses" are defined as operation and maintenance activities within the harbor environment and the impacts of these activities.

b. "Man's environment" includes the physical, biological, economic, and social components influencing the human community.

c. "Maintenance and enhancement of long-term productivity" is defined as the promotion of future activities or conditions beneficial to the natural and human environments expected to occur within the effective lifetime of the existing Detroit River Federal navigation channels.

7.02 The continued annual dredging of the unpolluted sections and the proposed resumption of annual maintenance of the polluted portions of the navigation channels of the Detroit River allows commerce to continue through the connecting channels of the Great Lakes system. Continuance of shipping within this system insures the satisfaction of both short-term immediate needs, such as the controlling deep-draft depths for the passage of cargo vessels, and long-term needs in the provision of continued access for waterborne commerce between the upper and lower Great Lakes. Maintenance dredging on the Detroit River system has been an ongoing operation since the early 1900's.

7.03 The removal of polluted sediments containing potentially harmful heavy metals and pesticides from the navigation channels will have a beneficial effect upon long-term natural productivity by improving sediment quality. The removal of polluted sediments makes the area more attractive to fish as a potential habitat and spawning ground. At the same time, benthic habitat that will be removed by dredging cannot be immediately replaced, and periodic dredging will prevent the reestablishment of a completely diversified community of benthic invertebrates.

7.04 Operation and maintenance activities in the Detroit River will not disrupt the natural productivity of the river system. Dredging will result in the temporary degradation of water quality in the dredging vicinity and slightly downstream and the open-lake since nutrients, potentially harmful chemical constituents, heavy metals and suspended solids will be reintroduced into solution. As materials settle following maintenance activities, a low-magnitude siltation of aquatic habitat will occur. The aquatic ecosystem within the dredging areas will be disrupted on a long-term basis due to the periodic disturbance or destruction of the benthic habitat.

7.05 Human productivity within the channel areas and in other locations where users of the river reside or do business, will benefit from continued maintenance and subsequent use of the Federal navigation channels. The river will continue to provide recreational opportunities for boaters, sailors and fishermen; economic opportunities to operators of marinas, yacht clubs, and terminals; public revenues generated from local, county, state and Federal governmental taxes and licenses related to the river activities; and community cohesion through a continuation of cultural events and social organizations directly or indirectly related to the navigation channels.

8. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE MADE IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

8.01 Implementation of the proposed project would result in the expenditure or elimination of various natural and human resources. In order to evaluate resource commitments that can be expected to occur as a result of proposed project activities in the Detroit River navigation channels, the following definitions are made:

a. "Irreversible or irretrievable commitments" are defined as those commitments of resources for periods of no less than 50 to 100 years.

b. "Natural resources" are defined as the physical and biological components identified in Section 2, including climate, physiography and topography, geology, soils, terrestrial vegetation, terrestrial wildlife, hydrology, sediment, aquatic vegetation, plankton, aquatic invertebrates and fisheries.

c. "Human resources" are defined as those environmental components directly associated with man's activities, including land and water uses, transportation, structures and utilities, public services and facilities, industry and business, employment and income, recreation, demography and cultural resources.

8.02 Continued maintenance dredging of the harbor, even on a periodic basis, will prevent the establishment of a diversified community of benthic macroinvertebrates. The river currents may disperse turbidity arising from dredging, thereby creating siltation which would affect aquatic habitat not specifically within the actual harbor maintenance area. The aquatic habitat in the open-lake disposal areas will be periodically disrupted by the deposition of dredged material and rock. The deposition of these materials will decrease lake depths on the order of a few centimeters in the dump zone.

8.03 The time, capital, labor, material, and fuel committed to the maintenance of the Detroit River navigation channels will not be retrievable. When dredging operations resume to remove the polluted sediments, and if funds are available, it is anticipated that the dredging operations will be accomplished every year for several months.

9. COORDINATION WITH OTHERS

A. Public Participation

9.01 In prior years no public meetings, hearings, or workshops were held concerning maintenance dredging and disposal operations. This was based on the fact that the harbors and navigation channels were established

as the result of Congressional legislation and the maintenance thereof was inherent in the Federal jurisdiction over navigable waterways.

9.02 The current practice is to issue a Public Notice of the intent to perform maintenance dredging in the specified Federal Navigation Channels and/or Harbors. This maintenance work is subject to review under the following laws: Federal Water Pollution Control Act of 1972, the National Environmental Policy Act of 1969, the Fish and Wildlife Act of 1956, the Fish and Wildlife Coordination Act of 1958, the Marine Protection Research and Sanctuaries Act of 1972, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, as well as the various Congressional Acts authorizing construction and maintenance of the Federal project.

9.03 Any person who has an interest which may be affected by the disposal of this dredged material may request a public hearing. The request must be submitted in writing to the District Engineer within thirty (30) days of the date of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

9.04 A public notice (Appendix E) describing the proposed derrickboat maintenance work in the Detroit River was issued 21 August 1974. Copies of this notice were sent to governmental agencies, citizen organizations, and individuals. Since the Confined Disposal Facility authorized for construction offshore Pointe Mouillee, Michigan, is not yet available, the dredging of polluted bottom sediments was not considered or noticed at this time.

9.05 Responses to this notice were received from the U. S. Environmental Protection Agency (EPA), the Detroit Metro Water Department, and the Michigan Consolidated Gas Company. The EPA proffered advice on dredging and disposal procedures particularly to minimize increases in suspended solids, turbidity, soil erosion and runoff. The Detroit Metro Water Department responded that there was no apparent conflict between its interests and the proposed dredging operations. Michigan Consolidated Gas Company requested that no rock disposal be made over a company pipeline crossing the lower Trenton Channel. The lack of any other response to the Public Notice is taken to mean that there is no further objection to the maintenance operations or to the proposed sites for the disposal of the removed material. The need for a public hearing, therefore, has not been demonstrated at this time.

9.06 The District Engineer subsequently determined that it was in the overall public interest to continue removing hard bottom obstructions while an EIS regarding maintenance dredging of the navigation channels in the Detroit River was prepared. A statement of findings to that effect was made a matter of record on 11 September 1974 and a written determination not to hold a public hearing was issued on 1 October 1974. The derrickboat maintenance and disposal work was directed to proceed as announced in the public notices.

9.07 In October 1975 the Corps was requested to attend the board meeting of the Grosse Ile Township Commission for a discussion of the proposed maintenance dredging plan as described in the Draft EIS. Representatives of the Detroit District attended the township meeting on 27 October and explained the reasons for an environmental statement, the proposed plan, and the scope of work including the present status of the uncompleted portions of authorized channel work in the Trenton Channel. No further correspondence has been received subsequent to the Township Board meeting.

B. Government Agencies

9.08 Copies of this notice were sent to the Environmental Protection Agency, the Department of the Interior, the Department of Commerce, the Coast Guard, the State of Michigan, Wayne County, the City of Detroit, and other Federal, State and Local agencies. The response received is outlined in paragraph 9. and the letters are included with this final statement.

9.09 Comments to the DEIS were received from eleven government agencies, including one from the Canadian government. Most concern seemed to be about the composition or type of material to be dredged and the effects of dredging and open water disposal upon the benthic communtiy. EPA classified the project as LO - Lack of Objections.

9.10 Local governments indicated that no problems were anticipated to any of their respective functions from the maintenance dredging operations. The Southeast Michigan Council of Governments (SEMCOG) expressed the opinion that the benefits resulting from the maintenance operation appear to outweigh the adverse effects.

C. Citizen Groups

9.11 No comments to the Public Notice of 21 August 1974 (or to the Statement of Findings) were received from concerned citizens or public organizations.

Only one letter of comment on the DEIS was received from a concerned environmental organization, expressing concern of the effect upon the benthic community and whether or not the waterfowl migration pattern would be altered by the dredge and fill activities. Since the benthic communities in the dredging areas are predominantly pollution tolerant, the best way to improve the situation is removal of the sediment. Our information does not indicate that migration patterns would be affected by maintenance operations.

D. Comments and Response

The Draft Environmental Statement was sent to the following agencies and groups requesting their review and comments:

Canadian Agencies

Ontario Ministry of the Environment*
Ontario Region - Environment Protection Service
Canada Center for Inland Waters
Windsor Harbour Commission

Federal Agencies

Advisory Council on Historic Preservation*
Federal Power Commission
U. S. Department of Agriculture - Forest Service*
U. S. Department of Commerce, NOAA*
U. S. Department of Health, Education, and Welfare
U. S. Department of the Interior*
U. S. Department of Transportation - Federal Highway Administration*
U. S. Environmental Protection Agency*

State Agencies

State of Michigan - Department of Natural Resources*
State of Michigan - Historic Preservation Officer*
State of Michigan - Department of Commerce
State of Michigan - Officer of the Governor
Michigan Conference of Archaeology
Michigan State University
University of Michigan
State of Ohio - Department of Natural Resources
State of Ohio - Environmental Protection Agency

Local Agencies

County Governmental Agencies
City Governmental Agencies*
Southeast Michigan Council Governments*

Environmental and Civic Groups

Sierra Club
Michigan United Conservation Clubs
League of Women Voters
National Audubon Society

Environmental and Civic Groups (continued)

Lake Erie Advisory Committee
Lake Erie "Waterfowlers"
Pointe Mouillee Waterfowlers*
Wayne County Sportsmans Club
Senators, Representatives, and Individual Citizens

Industry

U. S. Steel Corporation*

*Indicates that comments were received to the DEIS from these agencies, groups, or individuals.

Comments received are listed in the following section with appropriate responses. Copies of the original correspondence are included in Appendix F.

Ontario - Ministry of the Environment

1. Comment:

a) The DEIS does not clearly identify how much material is to be dredged from each channel, describe the quality of that material, or indicate the disposal site location.

b) The classification of the sediments is based on 1970, 1973 and 1974 EPA surveys when sampling was apparently done at their water quality stations at fixed river ranges. It has been our experience that a sampling program designed to collect representative samples of material to be dredged may yield quite different results (due to the depositional characteristics of the river) from a routine monitoring program.

c) There is no elaboration of how EPA determine the pollution status of the material, but it would appear that they have used the Jensen criteria "or bulk sediment analysis" rather than a specific assessment of the dredging operation.

Response:

a) Until such time as accumulated backlog is removed, the following action is anticipated. The Upper Livingstone channel is not classified by EPA as polluted; is generally rocky and the material is usually placed onto the dikes adjacent to the channel. The Lower Livingstone is polluted clay and sandy silt, and about 600,000 cubic yards is proposed to be removed annually when dredging operations resume for this section, and disposal will be into the confined disposal facility (CDF) to be constructed at Pointe Mouillee. The East Outer Channel is mainly polluted sand, silt and clay, and about 1,750 cubic yards is proposed for annual removal upon construction of the Pointe Mouillee CDF where disposal is to be accomplished. The Trenton Channel is polluted sandy clay (in the upper section) and rocky (in the lower) but is not scheduled for maintenance. The Amherstburg Channel is mostly rock with some clay, is classified as polluted, and about 50,000 cubic yards is to be removed annually with eventual disposal at Pointe Mouillee. After the backlog is removed, the annual requirements will be as noted in paragraph 1.15.

b) The stations, where sediments were collected, were EPA established (STORET) stations and were selected to provide characterization of the sediment condition of the river. The sediments are continually moving, due to the strong current, variable winds, and propeller wash from deep-draft vessels.

c) Appendix D, indicates the criteria used by EPA to determine the status of the sediments. This is known as the "Jensen criteria" or "bulk sediment analysis."

2. Comment:

a) The DEIS would be more useful if references were provided for the claims made.

b) In Section 4.01(3), the amount of micro-toxic heavy metals reintroduced is reportedly insignificant, but in Section 5.03, the release of nutrients and heavy metals is an unavoidable impact. Further, nutrients and heavy metals are claimed to exise in a "stable non-reactive status" although they are widely reported in the literature to interact with the overlying water.

c) Section 4.03 says "it has been noted..." an impossible statement to verify as presented.

Response:

a) References in the DEIS were cited wherever conclusions, statements, or data were incorporated. Some additional references have been included in the text of the FEIS. Other statements would have been referenced if specifics were made known.

b) The resuspension of contaminated materials (nutrients and metals) will result in an unavoidable temporary degraded condition. However, there is an insignificant release of these pollutants, and aquatic life is not threatened. The nutrients and heavy metals found in "Stable non-reactive Status" are those in sediments just below the surface layer of sediment. Due to the variable current, wind and propeller wash, the surface layer is continually changing and interacting with the overlaying water.

c) This statement has been changed to indicate the source of the information.

3. Comment:

Short-term localized problems are acknowledged without indicating whether they will violate State of Michigan water quality standards. While dredging in Province of Ontario waters, the Corps will be expected to comply with this Ministry's "Guidelines and Criteria for Water Quality Management in Ontario (copy attached).

Response:

According to the Department of Natural Resources for the State of Michigan, Part 4, Water Quality Standards, R 323.1092 Dredging (Appendix C), the state water quality standards do not apply to dredging activities.

The Corps maintenance work complies with the Agreement between the United States of America and Canada on Great Lakes Water Quality, signed at Ottawa April 15, 1972 which states in Article V(f):

Pollution from Dredging Activities. Measures for the abatement and control of pollution from dredging activites, including the development of criteria for the identification of polluted dredged spoil and compatible programs for disposal of polluted dredged spoil, which shall be considered in the light of the review provided for in Annex 6; pending the development of compatible criteria and programs, dredging operations shall be conducted in a manner that will minimize adverse effects on the environment.

To the best of our knowledge the criteria alluded to above is still under development by a joint Canadian-American committee.

4. Comment:

a) Little detail is provided on actual impact assessment. Will the dredge hoppers be allowed to overflow when dredging polluted sediments?

b) What levels of contaminants can be anticipated in the overflow?

c) What impact will these levels have on the aquatic organisms at the site?

d) What organisms will be buried at the open water disposal sites?

e) How long will it take for the benthic organisms to re-establish?

f) What effect will that have on the fishery?

Response:

a) A paragraph on the impact of dredging overflow has been added to the FEIS (See Section 4A, paragraph 4). Yes, the hoppers will overflow during dredging, although precautions will be taken to minimize the amount of overflow.

b) Since the polluted portions of the Detroit River have not been dredged since 1970, we cannot predict the levels of pollutants expected in the overflow.

c) Because information on the levels of potential toxicants is unavailable, we can only generalize from impacts encountered at similar dredging locations. Nutrients (depending upon the level) can encourage a temporary increase in aquatic vegetation growth (algae blooms). When this occurs, an adverse impact is anticipated, resulting from an inbalance in the food chain. Turbidity generated during dredging operations reduces light penetration and temporarily limits the photosynthetic process of phytoplankton, thus affecting the food chain.

d) A survey has not been conducted to ascertain what organisms are inhabiting the open water disposal site. We are assuming them to be similar to other tolerant forms found in the western basin of Lake Erie.

e) Recolonization is generally dependent upon the species nature and mobility of organisms inhabiting the affected areas and the subsequent type of substrate (15).

f) Dredging operations would have a minimal adverse impact on fishing activities as evidenced by the fact that such maintenance work has been proceeding for many years without impeding the growth of recreational activities.

5. Comment:

The statement indicates that the Lake Erie Sailing Course dredged spoils would be open water disposed on the Canadian side of Lake Erie, although no sediment sample results are presented for that channel. Please forward to this office whatever data are available to classify those dredge spoils.

Response:

The Corps disposal location for materials removed from the Lake Erie Sailing Course is in the area west of the East Outer Channel, in Michigan waters, as described in Section 1.11 and located on Figure 2. The Corps has not analyzed bottom sediment data for this location but relies on EPA to indicate the status of materials to be removed from the navigation channels.

6. Comment:

We concur with the decision not to dredge any contaminated spoils until the Pointe Mouillee disposal facility is available. a) Would you update me on the status of that project and forward any details on the final design.

b) I am particularly interested in design studies that may have been done to determine how effectively the facility will confine mercury contaminated sediments.

c) This Ministry should also be kept informed of any dredging scheduled for Ontario waters of the St. Clair system, Detroit River or Lake Erie.

Response:

a) Construction is anticipated to be initiated in May of 1976 with completion by September of 1978.

b) A design analysis for the confined disposal facility off Pointe Mouillee was formulated and the information is part of the study document. This information will be forwarded to you.

c) We apologize for not sending the official public notices for the proposed maintenance dredging of the St. Clair System, Detroit River or Lake Erie. Your agencys' name has been placed on the mailing list.

Advisory Council on Historic Preservation

1. Comment:

While you have discussed properties that are presently on the National Register of Historic Places and have determined that your project will have no effect on those properties, you have not provided evidence that all properties that may be eligible for the National Register have been considered in accordance with our Procedures (36 CFR Part 800). Please furnish this additional information.

Response:

Paragraph 2K. points out a potential candidate, Celeron Island, for the National Register and the State Historic Preservation Officer concurs that the maintenance will have no effect on cultural resources. A paragraph 4. has been inserted in the impact section indicating that there will not be any historical or cultural resources affected by the mainenance dredging operations.

2. Comment:

The final environmental statement should contain evidence of full compliance with our procedures and a copy of the comments of the Michigan State Historic Preservation Officer.

Response:

The information from the Historic Preservation Officer has been included in the FEIS and the letter attached as part of Appendix F.

U.S. Department of Agriculture-Forest Service

1. Comment:

Since most of the dredge disposal will not be on land, and the only on-land disposal is already described in the DEIS (p.8), we have no comments on the above statement.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

U.S. Department of Commerce-NOAA

1. Comment:

There are no objections to the maintenance dredging in the Detroit River with disposal of clean spoil in Lake Erie and that of polluted spoil in a diked area.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

2. Comment:

It appears that the most shoaling in the seven mile long East Outer Channel comes from the surrounding bottom material of Lake Erie. Samples should be taken from the nearby Lake Erie bottom and compared with the samples from the navigation channel. If the channel shoaling material could be disposed of in open lake without downgrading lake bottom characteristics, savings would be realized in disposal costs and in extending the life span of the diked disposal facility.

The shoaling material removed from the East Outer Channel is an accumulation from the surrounding bottom material and from the industrial and municipal wastes upstream. A pilot study, conducted by the Corps and EPA in 1967 and 1968 investigated this condition; however, the results were inconclusive. Further studies are being planned to ascertain whether material in the navigation channel and the nearby lake area are similar and if disposal of the channel material over this lake area will not downgrade the existing lake bottom.

U.S. Department of the Interior

1. Comment:

Three Land and Water Conservation Fund (LWCF) projects --

Harrison Street Riverfront Park (26-00370), River Boat Launch Park (26-00165), and three fishing piers at Belle Isle (26-00622) -- may be affected by the planned maintenance dredging. Such activity involving the existing channel may impact the River Boat Launch Park (near the mouth of the Ecorse River and across from Mud Island) and fishing piers on Belle Isle. Impacts on Belle Isle and River Boat Launch Park probably are temporary and concern such items as noise and stirring up of sediments. While these impacts have been mentioned elsewhere in the draft, we believe that a subsection on the Impacts on Recreation should be included in the final statement.

Response:

The River Boat Launch Park (near the mouth of the Ecorse River) is located just off the Trenton Channel, which is authorized, but not scheduled, for annual maintenance. Since shoaling does not occur in this area, only occasional minimal work is [illegible] this channel. This situation also exists for the channels [illegible] consequently these areas will not be affected to any [illegible] free in the maintenance dredging operations. Impacts on [illegible] facilities are anticipated to be minimal and are mentioned [illegible] Since the above projects impinge upon an estab[illegible] waterway of the U.S., their construction would require a permit from the Corps of Engineers under the provisions of Section [illegible] River and Harbor Act of 1899; 33USC403.

2. Comment:

Extending the turning basin located south of the Grosse Isle Bridge to its maximum dimensions apparently would require dredging and subsequent use which may impact the Harrison Street Riverfront Park. More information should be provided on this extension. Possible impacts would include stirring up of sediments, conflicts between lake vessels and recreational boats, and removal of polluted sediments. We understand, however, that this portion of the project was classified as inactive in 1970 and that deauthorization has been requested. The actual status should be discussed, as should the impacts of maintenance of the existing 21-foot channel depth if the 28-foot channel and extension of the turning basin are deauthorized.

Response:

As you indicated, this portion of the project (extending the turning basin south of the Grosse Isle Bridge to maximum dimensions) was classified inactive. It has been recommended for deauthorization and is before Congress for such consideration. It is anticipated that this recommendation will be approved. Since this extended area has never been dredged and probably never will be, the Harrison Street

Riverfront Park should not be affected by the maintenance operations. This information has been included in the FEIS in paragraph 1.06. However, we would presume that these recreational projects are being planned, designed and constructed with the full knowledge of the pre-emptive rights of deep-draft navigation that has been established in this waterway.

U.S. Department of Transportation-Federal Highway Administration

1. Comment:

As requested, we have reviewed the draft environmental statement for proposed dredging of the connecting channels of the Detroit River, Michigan and have no comments concerning the statement.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

U.S. Environmental Protection Agency

1. Comment:

We have completed our review of the Draft Environmental Impact Statement (EIS) for Maintenance Dredging of the Federal Navigation Channels, Detroit River, Michigan as requested in your September 25, 1975 letter. Based on the information provided in the EIS, we have no major objections to the proposed dredging and find the EIS to be satisfactory.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

2. Comment:

Due to the highly polluted nature of certain segments of the Detroit River, we request that special precautions be taken to minimize water quality degradation during maintenance activities. Consideration should be given to the use of special pollution abatement measures and equipment such as reduced hopper overflows, barrier curtains, etc. As noted in the EIS, our December 11, 1974 comments regarding the proposed project recommended the incorporation of a number of pollution abatement procedures to minimize adverse water quality impacts. These procedures should be included in the Final EIS.

Response:

EPA's recommendations for minimizing the effect of dredging upon water quality has been included in the FEIS in Section 4.A, under the Subsection Dredging Overflow Effects.

3. Comment:

a) The Final EIS should address the biological and physical effects of placing rock materials (page 8) removed by the grab dredge upon uplands, compensating dikes and in the deep water adjacent to the channel.

b) The percentage of the material in terms of rock, sand, etc. that is being dredged should be described.

Response:

a) The physical effects of the disposal of rock materials is discussed in paragraphs 4.02-4.05 and the biological effects in paragraph 4.11, 4.13 and 4.17.

b) The grab dredge is designed and used principally for the removal of large solid material. Whatever amount of sand or silt that is removed by this dredge type is negligible.

4. Comment.

Based on the above discussion, we have classified the project as LO (Lack of Objections) and have rated the EIS as Category 1 (Sufficient). We appreciate the opportunity to review this Draft EIS.

Response:

This information is noted in the FEIS and the letter compiled in Appendix F of the FEIS.

State of Michigan-Department of Natural Resources

1. Comment:

Page 1 - 1.01 of the DEIS

a) In order to minimize the re-depositing of sediments (especially when the hopper dredge is removing fine materials) it would appear desirable to work from an upstream to downstream direction.

b) For the same reason, it would also appear desirable to complete the River Rouge maintenance dredging prior to that portion of the Detroit River lying below the mouth of the Rouge.

Response:

a) This procedure is used.

b) Due to the backlog of sediment deposits in the Detroit River, the proposed dredging will have to be conducted throughout most of the navigational season. Rouge River maintenance is usually accomplished in late autumn.

2. Comment:

Page 8 - 1.15 of the DEIS

a) It is our impression that most maintenance dredging involves removal of re-deposited silty and sandy materials. We're curious as to where the "principally rocky" materials come from.

b) Are these materials re-deposited in the channel or blasted loose to deepen channels?

Response:

a) These "principally rocky" materials are natural in sections of the channels particularly in the lower Detroit River where bedrock formations are exposed on the river bottom.

b) During initial deepening and widening of the channels blasting occurred and some of this material is still within the area and gets shifted or broken-off by the passage of vessels and/or wave action.

3. Comment:

Page 9 - 1.19 of the DEIS

a) It is stated that a cost-benefit analysis is not provided because of the intangibility of the benefits. It is further stated that the district engineer is aware of the utilization at the project and furnishes same with a request for maintenance funds. Cannot information on the utilization be summarized for inclusion in the EIS?

b) Also, how do the costs and environmental impacts of other modes of commercial transportation (I.E. railroads) compare with the costs of shipping, channel maintenance, and disposal of dredged materials?

Response:

a) The information used by the District Engineer is contained in the narrative of the EIS. Since the Detroit River is a Great Lakes connecting channel, it must be maintained to provide safe navigation for commercial cargo, which averages about 110,000,000 tons per year.

b) The Great Lakes waterways are used mainly for the transport of bulk materials. For example, the primary commodity that is transported through the Great Lakes is iron ore and moves basically from Lake Superior through the Detroit River to the Lake Erie ports. To transport ore from the Marquette Range by rail to Detroit, the cost would run about $11.85 per ton. To transport the ore from the same range by rail to Escanaba and then by water to the lower lakes the cost would run about $5.54 per ton. Upon resumption of the channel maintenance, dredging and disposal costs are anticipated to total about $2,963,500 to remove nearly 672,000 cubic yards, which computes to about $.03 per ton of cargo that is transported through the navigation channels.

4. Comment:

Page 12 - 2.02 of the DEIS

In addition to the numerous commercial vessels, mention should also be made of the thousands of pleasure boaters that use the area.

Response:

This information has been added to Section 2F. on Recreation in the FEIS.

5. Comment:

Page 16 - 2.20 of the DEIS

The information regarding the plantings of salmon and trout should be updated. In each of the years 1974 and 1975: 300,000 chinook salmon and 50,000 steelhead were planted off the south end of Belle Isle; 100,000 chinook and 100,000 coho salmon were planted in the Huron River south of Detroit. In 1974, 20,000 brown trout were stocked in the north channel of the lower St. Clair River and near Detroit.

Response:

We appreciate the updated information and have inserted the figures into Section 2.F on Recreation in the FEIS.

6. Comment:

Page 18 - 2.21 of the DEIS

Common loons do not breed in this part of Michigan as is stated.

Response:

This statement has been corrected in the FEIS.

7. Comment:

Page 18 - 2.22 of the DEIS

Gulls and terns are not "shorebirds". We suggest substitution of "non-game water birds."

Response:

The appropriate correction has been made in paragraph 2.26 of the FEIS.

8. Comment:

Page 18 - 2.23 of the DEIS

This paragraph should appear under recreation on page 16 under item F. Also, it should be noted that about 1,000 scaup per square mile of open water have been shot annually in recent years in the area between Celeron Island and Detroit Light.

Response:

This paragraph has been placed in Section 2.F as you suggested and the information on scaup included in Section 2.G in the FEIS.

9. Comment:

Page 18 - H. of the DEIS

We feel data on visible oils (a pollutant affecting water quality) should be included in this section.

Response:

Actual data is not readily available on current oil levels. There has been a dramatic reduction from the 35,000 gallons of oil a

day dumped into the river during the late 1940's, to 3,676 gallons per day in 1963, to a present calculated 651 gallons per day. The Coast Guard has less oil calls to check than several years ago.

10. Comment:

Page 22 - 2.34 of the DEIS

It is stated the upper Livingstone Channel is considered to be unpolluted according to data collected by EPA in 1970 and 1973. Three sampling stations (9.2, 8.59, 7.4) are indicated (fig. 8, page 53) for upper Livingstone channel, but only data for station 9.2 can be found in Appendix B. Where is the data for station 8.59 and 7.4? This data should be included in the final EIS.

Response:

Stations 8.59 and 7.4 are actual EPA sampling stations. In 1970, samples were not obtained due to the rocky bottom, although attempts were made to secure bottom sediments. In order to remove further confusion these stations will be removed from Figure 8.

11. Comment:

Page 24 - 2.42 of the DEIS

The Great Lakes Sturgeon should be included in this paragraph, since it is likely to occur in the Detroit River.

Response:

The Great Lakes Sturgeon does nto appear in the "United States List of Endangered Fauna." Until the Department of the Interior places the sturgeon on the official list, we are advised to mention only those that have been specifically so indicated.

12. Comment:

Page 28 - 4.05(2) of the DEIS

The references to recolonization of surviving organisms should include an estimated time frame in which this occurs.

Response:

Recolonization is dependent upon the nature of the species, the type of substrate, and mobility of organisms inhabiting the area. This

information is from reference number 15. If sedimentation of the channel bottom reoccurs in similar fashion or if sufficient loose sediment remains on the channel bottom to support the benthic organisms, recolonization of these areas could be accomplished within two years. However, if maintenance dredging exposes a hard clay or rock bottom or if operations are conducted annually, then, of course, there would be little opportunity for recolonization to take place. The same situations hold for the open-water disposal areas, except in this instance, the controlling factor would be whether the depth of sediment accumulation over the area is sufficient to smother the existing organisms. If disposal were not annual and the sediment deposits were similar to adjacent lake bottom, migrating species, at least, could move into the site after disposal operations.

13. Comment:

Page 28 - 4.06 of the DEIS

No effects of the disposal on bird habitat are given. This should be provided in the final EIS.

Response:

A statement covering the effects on the bird habitat has been added to the FEIS in Section 4.B., Identified Biotic Impacts.

14. Comment:

Page 29 - 4.07 of the DEIS

It should be mentioned that invertebrates are an important part in the diet of fishes as well as waterfowl.

Response:

This has been added to the FEIS in Section 4 in the paragraph covering the overall ecology, 4.14.

15. Comment:

Page 29 - 4.08 of the DEIS

No references are given for the benthic studies referred to that were conducted in the late 1950's and in 1965. From a scientific standpoint they deserve the same citation in the reference section as census data, water quality data, and dredging studies.

Response:

We regret the initial omission of this information, and this has been corrected in the FEIS.

16. Comment:

Page 34 - 6.08 of the DEIS

In regard to the need for maintenance dredging to maintain depths for deep draft vessels, has any consideration been given to the possibility of designing lake freighters which can operate efficiently at lesser depths? We feel that such a discussion would be a useful addition to the environmental statement and suggest it be incorporated in the final EIS.

Response:

This is not considered a viable alternative. The trend is to design larger, more efficient vessels; the present Great Lakes fleet represents a substantial investment in the navigability of these connecting channels. The existing vessels operate economically and effectively only at or near maximum draft. To haul the equivalent load with a reduced draft, the vessel would have to be longer or wider or possibly both. Vessel lengths and beams are constrained by the St. Marys Falls Canal (Soo Locks) and also by the channel widths in some of the connecting waterways.

17. Comment:

Page 54 - Figure 9 of the DEIS

The 6th station entry under "Livingstone" on page B-7 is 1.05-0.2E (Appendix B). This station cannot be found on the location map in Figure 9. Could this correspond to station 1.05-0.4E on Figure 9? This should be clarified in the final statement.

Response:

The station on Figure 9 was in error and has been corrected to read 1.0S-0.2E.

Michigan Department of State-State Historic Preservation Officer

1. Comment:

Dr. Lawrence Finfer, Environmental Review Coordinator, has

reviewed the proposal for maintenance dredging in the Detroit River. He concludes that this project will have no effect on cultural resources.

Response:

This information has been included in the FEIS.

City of Detroit-City Engineering Department

1. Comment:

There is no apparent conflict between The Detroit City Engineering Department's interests and the proposed operations.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

City of Detroit-Planning Department

1. Comment:

The Planning Department, upon careful review of the draft EIS, finds no serious objections to the proposed dredging operations on the Detroit River, nor do the dredging operations conflict with any policies, plans or programs of the City of Detroit.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

Southeast Michigan Council of Governments

1. Comment:

A review of SEMCOG's planning efforts to date indicates that this proposal does not fall directly within the scope of any adopted plans or planning work underway. Thus, the comments which follow are not made in light of any adopted regional plans. Rather, they are made in light of A-95's allowed "Subject Matter of Comments and Recommendations" (OMB Circular A-95, as revised, paragraph 5).

Response:

This comment has been included in Section 3, FEIS and the letter compiled in Appendix F of the FEIS.

2. Comment:

It is noted in the DEIS that dredged material is polluted with several contaminants such as zinc, lead, mercury, among others. An effort should be made to effectively monitor these pollutants and keep any re-introduction of them minimal.

Response:

These contaminants are in the polluted sediments, and when the disposal site (Pointe Mouillee) is constructed, the disposal facility's overflow will be monitored so preventive action can be incorporated if necessary.

3. Comment:

Consideration should be given to contaminant removal from the dredged material in contrast to diked disposal. We feel that the entire summary discussion of dredging alternatives and disposal alternatives should be expanded upon in the final E.I.S.

Response:

The alternative section has been expanded in the FEIS, and the discussion on pretreatment as a disposal alternative includes additional information.

4. Comment:

Due to the very nature of the dredging operation, adverse environmental effects, such as turbidity and benthos destruction will occur.

Response:

This is an unavoidable situation, but it must be realized that the Corps attempts to eliminate the intensity of any adverse impacts through dredging management. Sections 5 and 7 discuss these effects.

5. Comment:

None the less while there will be negative effects even if the positive effect of the operation includes the removal of contaminated

sediments from the river bottom and maintenance of the shipping channels. We recognize the necessity for this maintenance, and are in full agreement with the termination of open lake disposal of polluted material. In our opinion, the benefits resulting from this operation appear to outweigh the adverse effects.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

Pointe Mouillee Waterfowlers Association

1. Comment:

a) The Waterfowlers conclude that maintenance of navigation channels in the Detroit River and in the shoal waters of the Lake Erie Sailing Course at Seaway depth is a necessary function given the state of our economy. However, we do feel strongly about the continuing unresolved conflict which was not mentioned in the Statement. It is the persistent question of monoculture versus biological variability. Has the pendulum swung too far in the direction of commercial use of this strategic waterway to the absolute detriment of other considerations? Can commercial navigation coexist with the biota of the region?

b) What is the total impact of dredge and fill activities on the migrational processes of diving ducks using the Chesepeake Bay Waterfowl Migration Corridor? Is the U.S. Army Corps of Engineers ever really going to address this phenomenon? We would insist on it and this Statement is a good place to start. The whole idea of asserting compatibility needs to be expressed more acutely from a scientific position.

Response:

a) The benthic communities in the Detroit River, from the junction of the Rouge River downstream for about 7 miles, exhibit a predominance (greater than 70%) of pollution tolerant species, which cannot be considered biologically variable. Maintenance dredging removes polluted material, thereby encouraging the development of species diversification. One cannot overlook the importance of commercial navigation on the Detroit River since this system is a link in the channels connecting the upper Great Lakes navigation routes with those of the lower Great Lakes.

b) The migration corridor, to which you make reference, is the Atlantic Flyway. A branch of the Mississippi Flyway also passes over this area. The total impact of dredge and fill activities on these migrational processes is not known. However, our information does not idicate that this action has affected the migration patterns you allude to. Perhaps, indirectly, since the waterway must be shared by cargo vessels and waterfowl but the navigation channel occupies only a small part of the aquatic area found in the lower Detroit River-Lake Erie complex. The degraded water quality and polluted bottom sediments which limits the diversity of aquatic micro and macro-organism should be the controlling limits on the establishment of the patterns for higher animal life. Channel maintenance has not been a significant contributor to these degraded conditions. Pilot-studies now underway have indicated that suitable habitat for encouraging waterfowl use can be established by judicial use of unpolluted dredged materials.

United States Steel Corporation

1. Comment:

Our primary interest in this matter is that of a possible supplier of stone for the construction of the disposal facility. Though we concur with the desire of the Lake Carriers Association to maintain lake traffic through dredging and necessary disposal facilities, we are not qualified to comment on environmental aspects.

Response:

This comment has been noted and the letter compiled in Appendix F of the FEIS.

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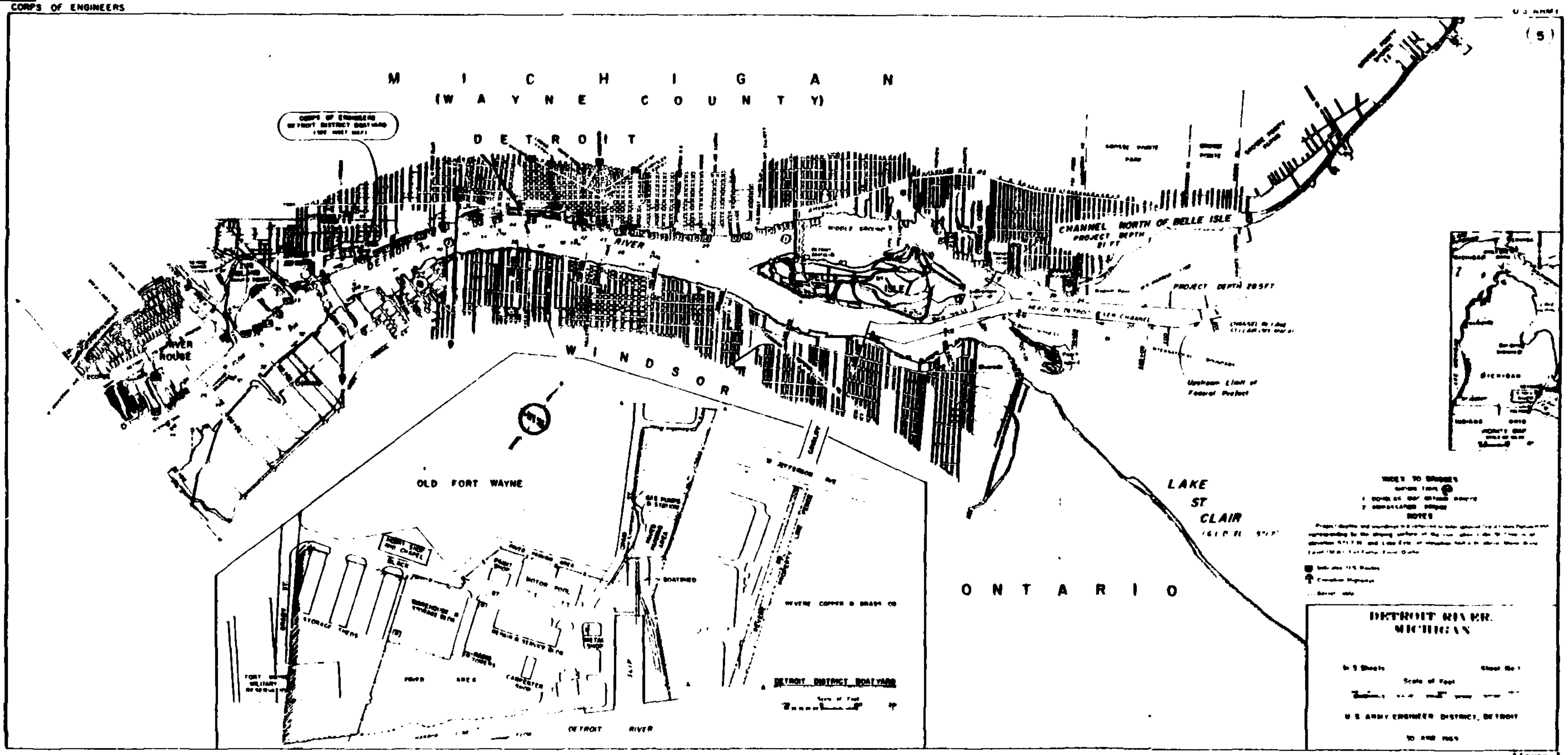

(5)
MICHIGAN
(WAYNE COUNTY)
DETROIT
CORPS OF ENGINEERS DETROIT DISTRICT BOATYARD
RIVER ROUGE
DETROIT RIVER
WINDSOR
OLD FORT WAYNE
CHANNEL NORTH OF BELLE ISLE
PROJECT DEPTH
PROJECT DEPTH 28.5 FT
Upstream Limit of Federal Project
LAKE
ST
CLAIR
ONTARIO
STORAGE SHEDS
MOTOR POOL
BOATSHED
SLIP
CARPENTER SHOP
DETROIT RIVER
REVERE COPPER & BRASS CO
DETROIT DISTRICT BOATYARD
NOTES
DETROIT RIVER
MICHIGAN
U.S. ARMY ENGINEER DISTRICT, DETROIT

Figure 1

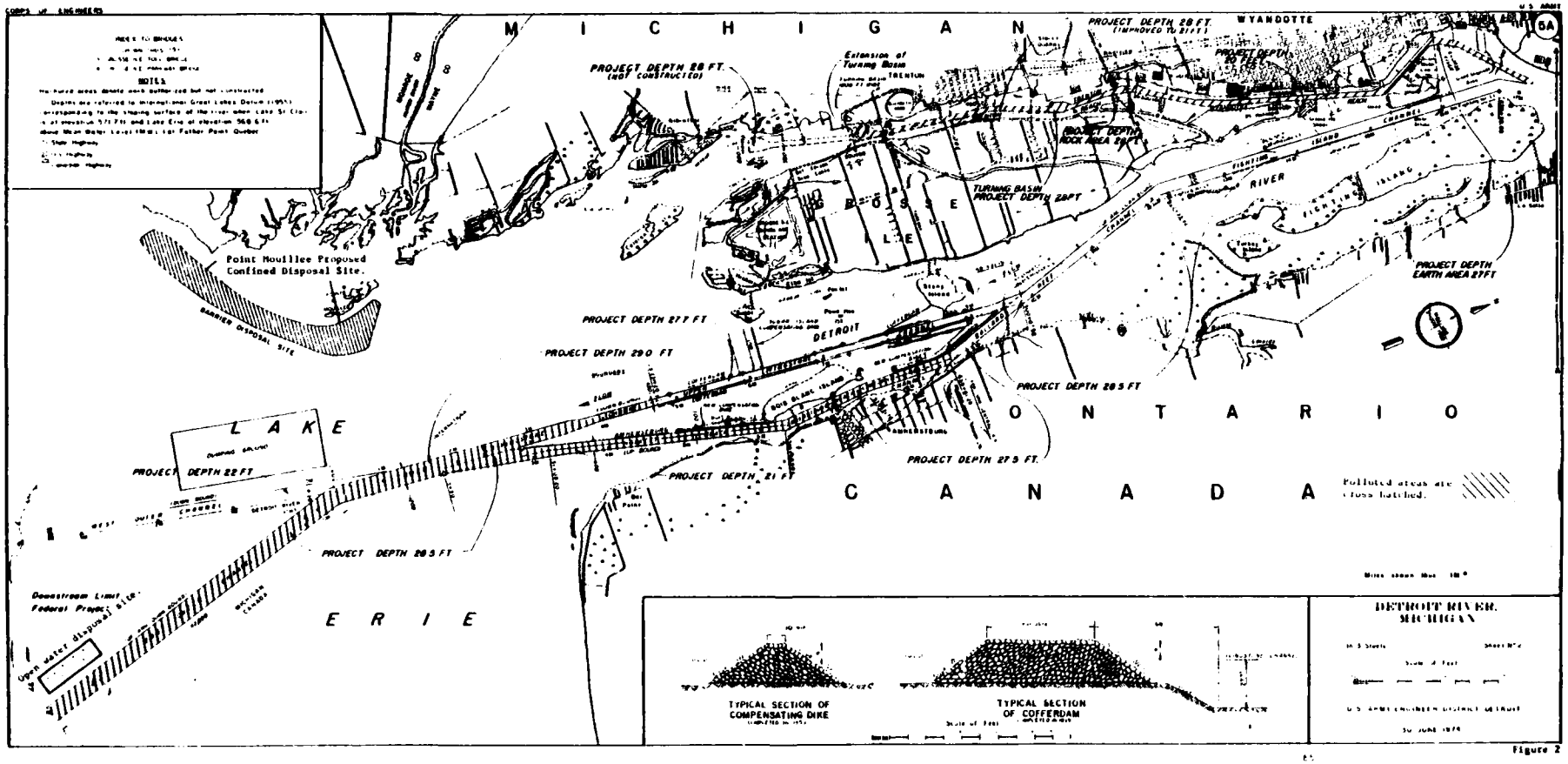
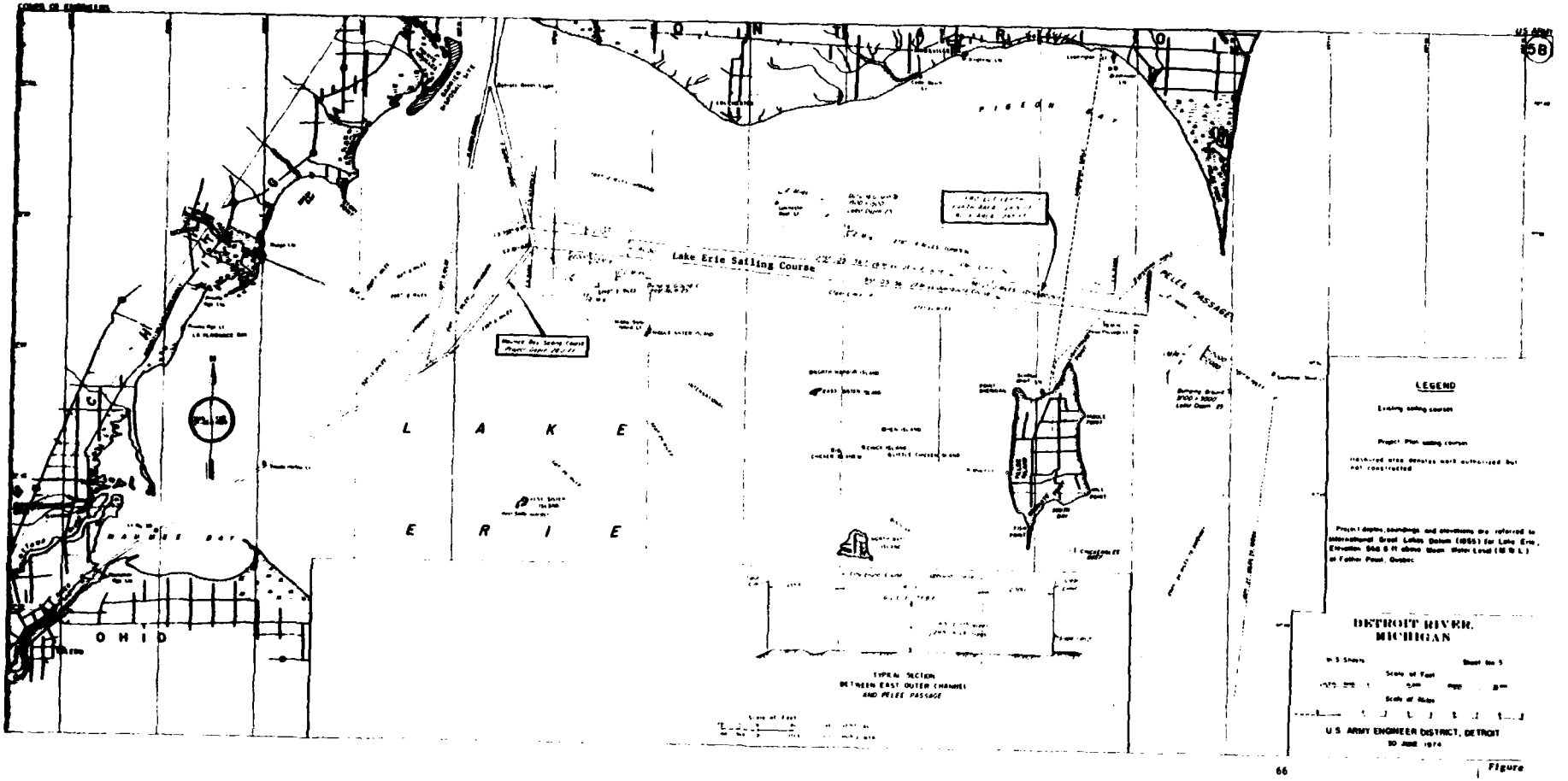
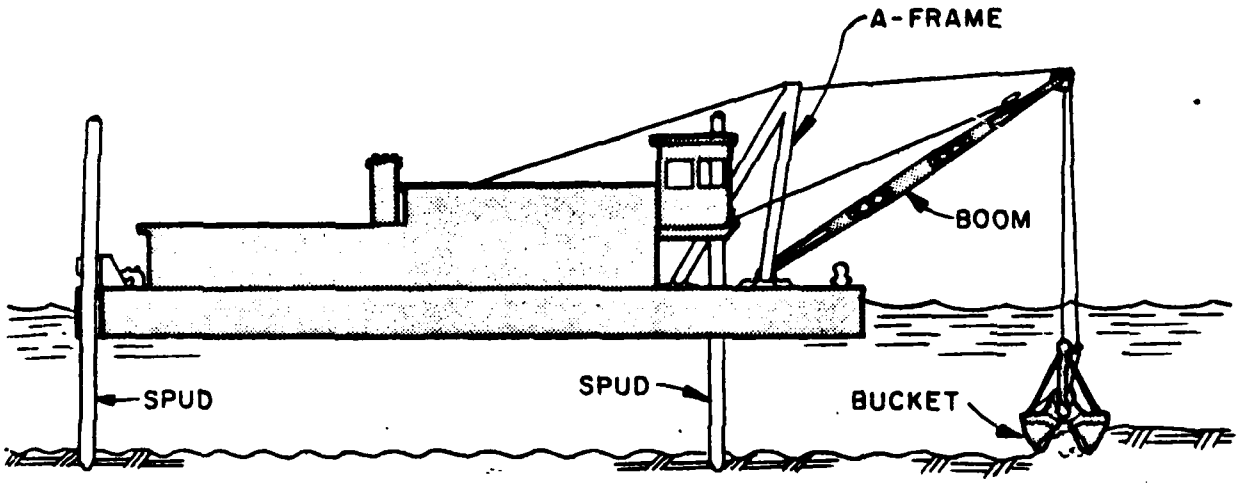

M I C H I G A N
L A K E
E R I E
C A N A D A
O N T A R I O
WYANDOTTE
TRENTON
DETROIT
BOBLO ISLE
RIVER
Point Mouillee Proposed Confined Disposal Site.
BARRIER DISPOSAL SITE
Upper water disposal site
Downstream Limit Federal Project
PROJECT DEPTH 28 FT. (NOT CONSTRUCTED)
PROJECT DEPTH 28 FT. (IMPROVED TO 31 FT.)
Extension of Turning Basin
PROJECT DEPTH ROCK AREA 28FT
TURNING BASIN PROJECT DEPTH 28FT
PROJECT DEPTH EARTH AREA 27FT
PROJECT DEPTH 27.7 FT.
PROJECT DEPTH 29.0 FT
PROJECT DEPTH 28.5 FT
PROJECT DEPTH 27.5 FT.
PROJECT DEPTH 21 FT
PROJECT DEPTH 28 FT
PROJECT DEPTH 28.5 FT
Polluted areas are cross hatched.
TYPICAL SECTION OF COMPENSATING DIKE
TYPICAL SECTION OF COFFERDAM
DETROIT RIVER, MICHIGAN

Figure 2


L A K E
E R I E
Lake Erie Sailing Course
LEGEND
DETROIT RIVER,
MICHIGAN
U.S. ARMY ENGINEER DISTRICT, DETROIT

Figure

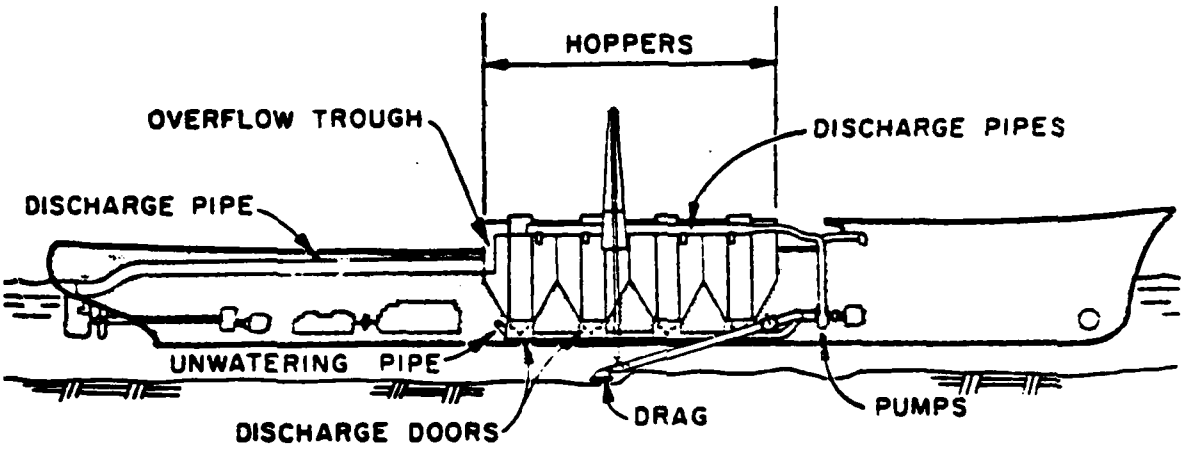
MECHANICAL DREDGE



GRAB DREDGE

Figure 4

HYDRAULIC DREDGE



HOPPER DREDGE

Figure 5

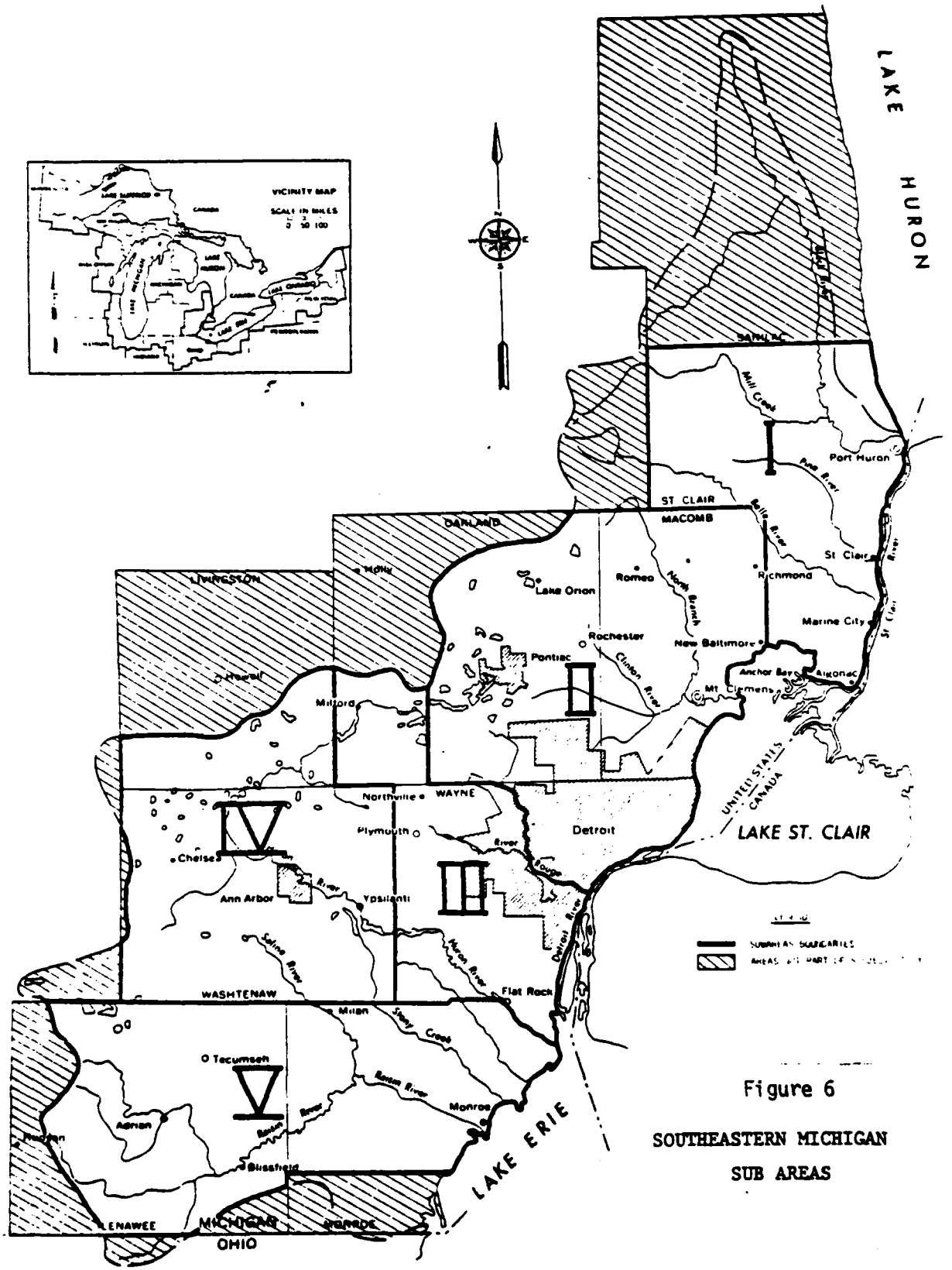


Figure 6

SOUTHEASTERN MICHIGAN

SUB AREAS

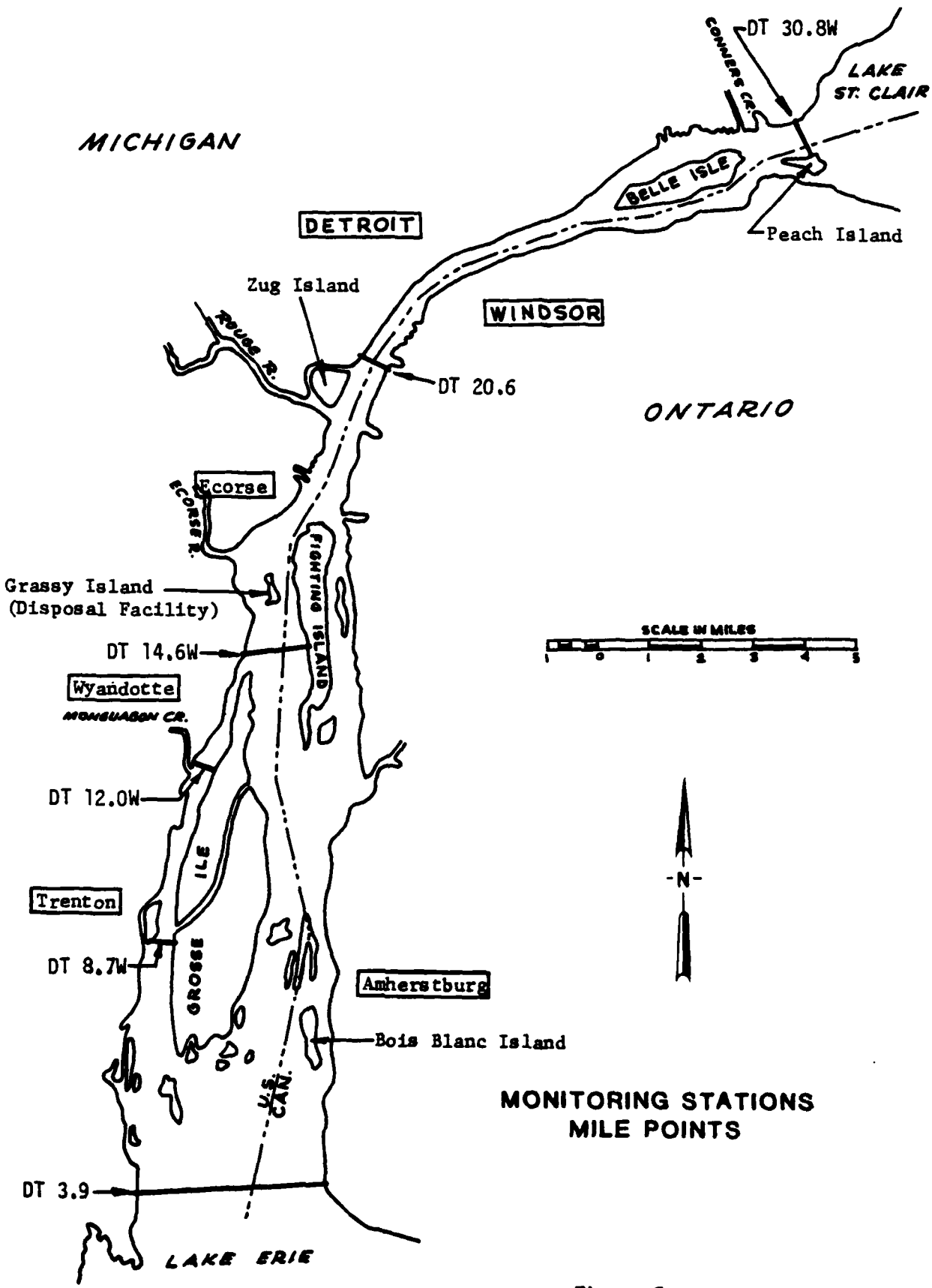
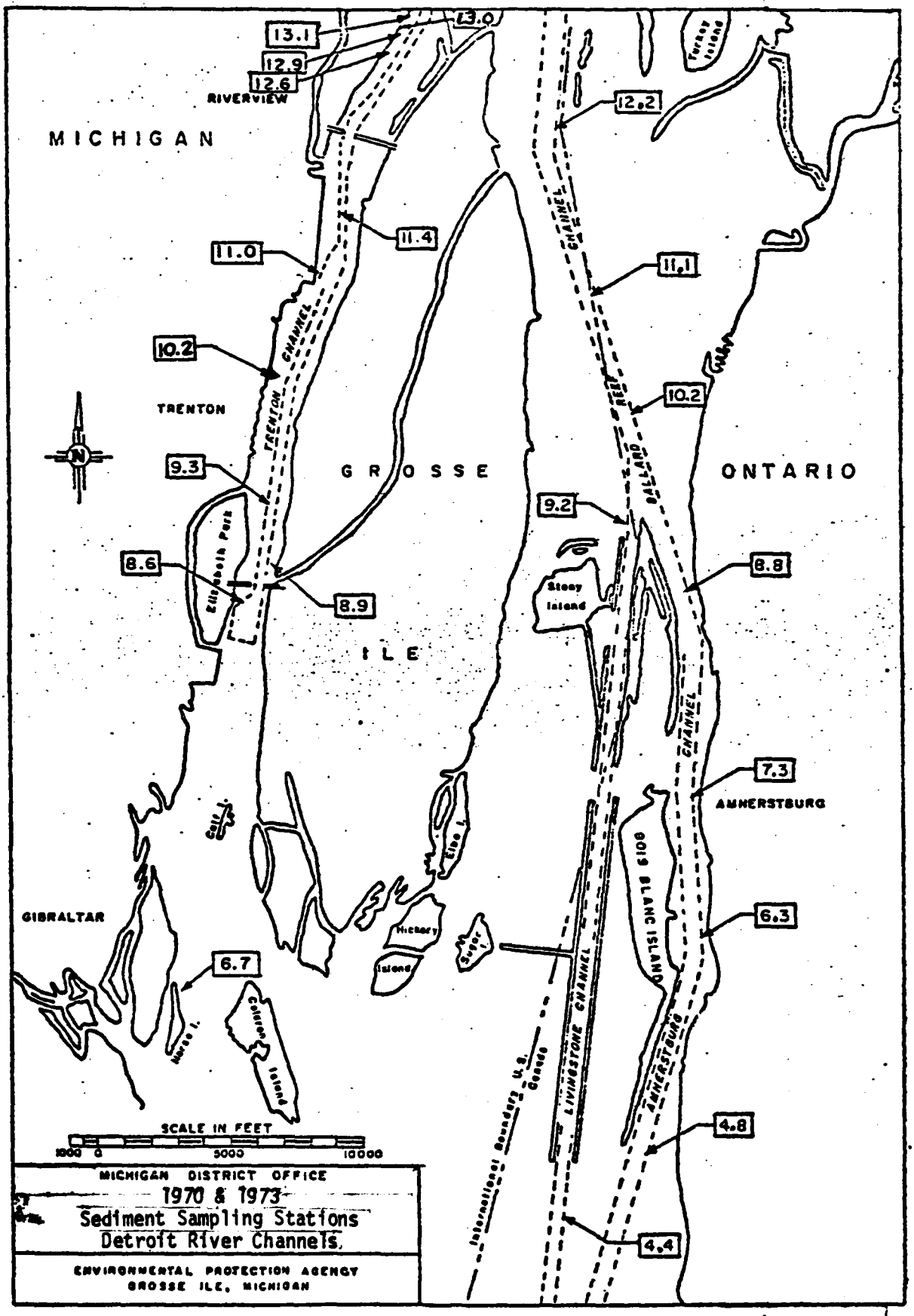
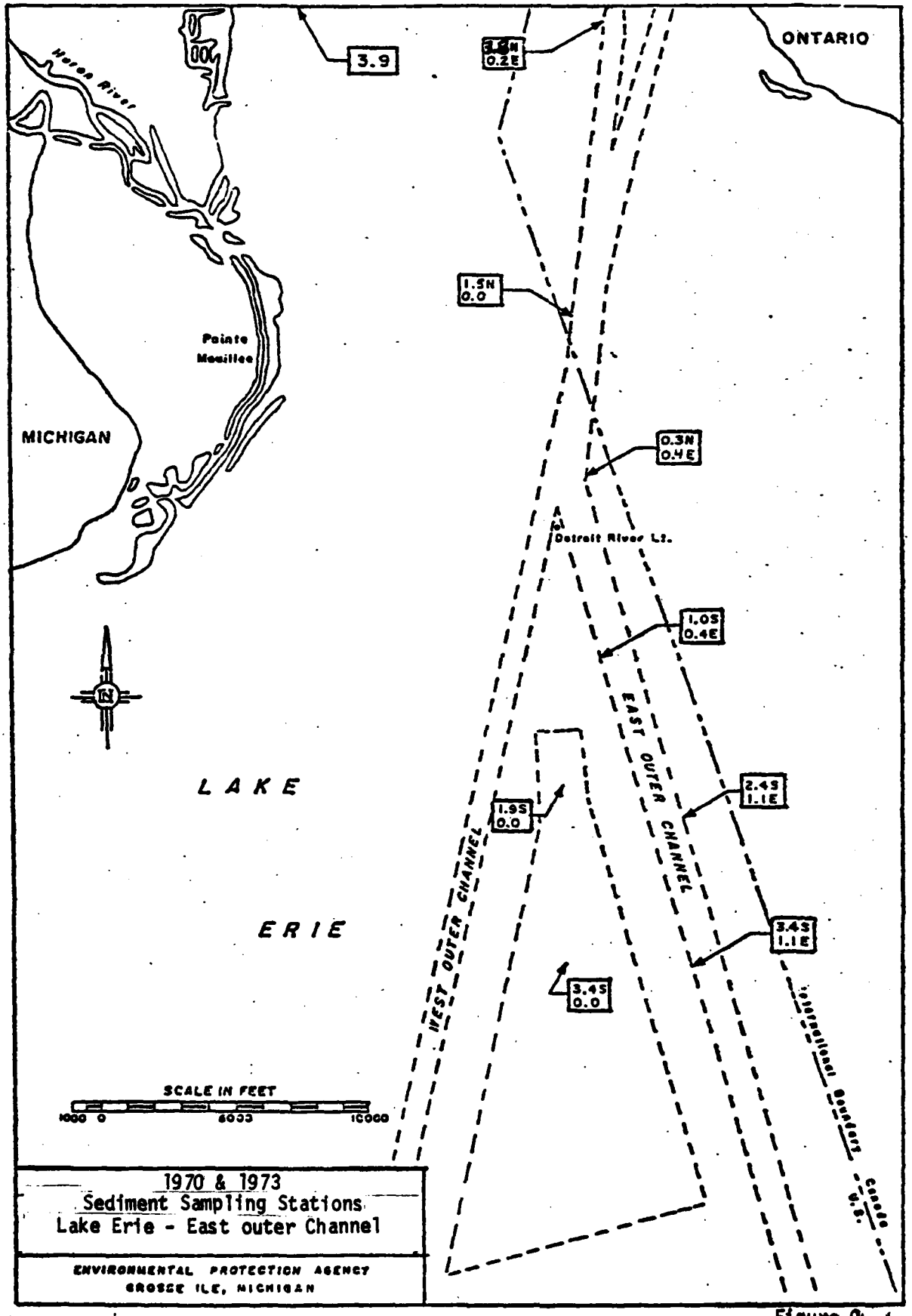

MICHIGAN
ONTARIO
DETROIT
WINDSOR
Zug Island
Rouge R.
DT 30.8W
CONNERS CR.
LAKE ST. CLAIR
BELLE ISLE
Peach Island
DT 20.6
Ecorse
ECORSE R.
FIGHTING ISLAND
Grassy Island
(Disposal Facility)
DT 14.6W
Wyandotte
MONGUAGON CR.
DT 12.0W
ILE
Trenton
DT 8.7W
GROSSE
Amherstburg
Bois Blanc Island
U.S. CAN.
DT 3.9
LAKE ERIE
SCALE IN MILES
0 1 2 3 4 5
N
MONITORING STATIONS
MILE POINTS

Figure 7

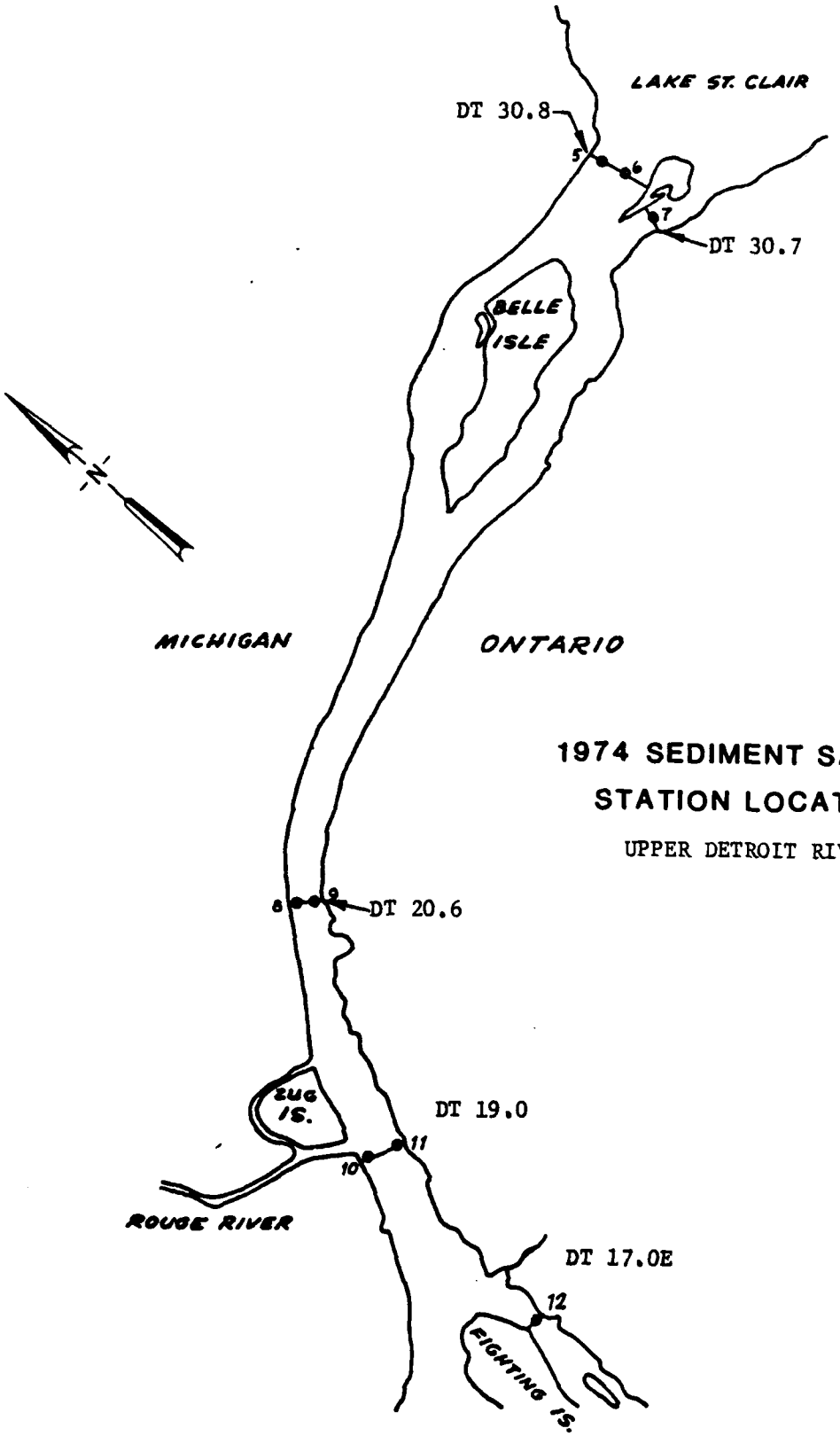

13.1
13.0
12.9
12.6
RIVERVIEW
MICHIGAN
12.2
11.4
11.0
11.1
10.2
TRENTON
TRENTON CHANNEL
DETROIT RIVER
10.2
9.3
GROSSE ILE
ONTARIO
9.2
8.6
8.9
8.8
Stony Island
7.3
AMHERSTBURG
BOIS BLANC ISLAND
GIBRALTAR
6.7
6.3
SCALE IN FEET
1000 0 5000 10000
4.8
4.4
MICHIGAN DISTRICT OFFICE
1970 & 1973
Sediment Sampling Stations
Detroit River Channels.
ENVIRONMENTAL PROTECTION AGENCY
GROSSE ILE, MICHIGAN



1970 & 1973
Sediment Sampling Stations
Lake Erie - East outer Channel

ENVIRONMENTAL PROTECTION AGENCY
GROSSE ILE, MICHIGAN

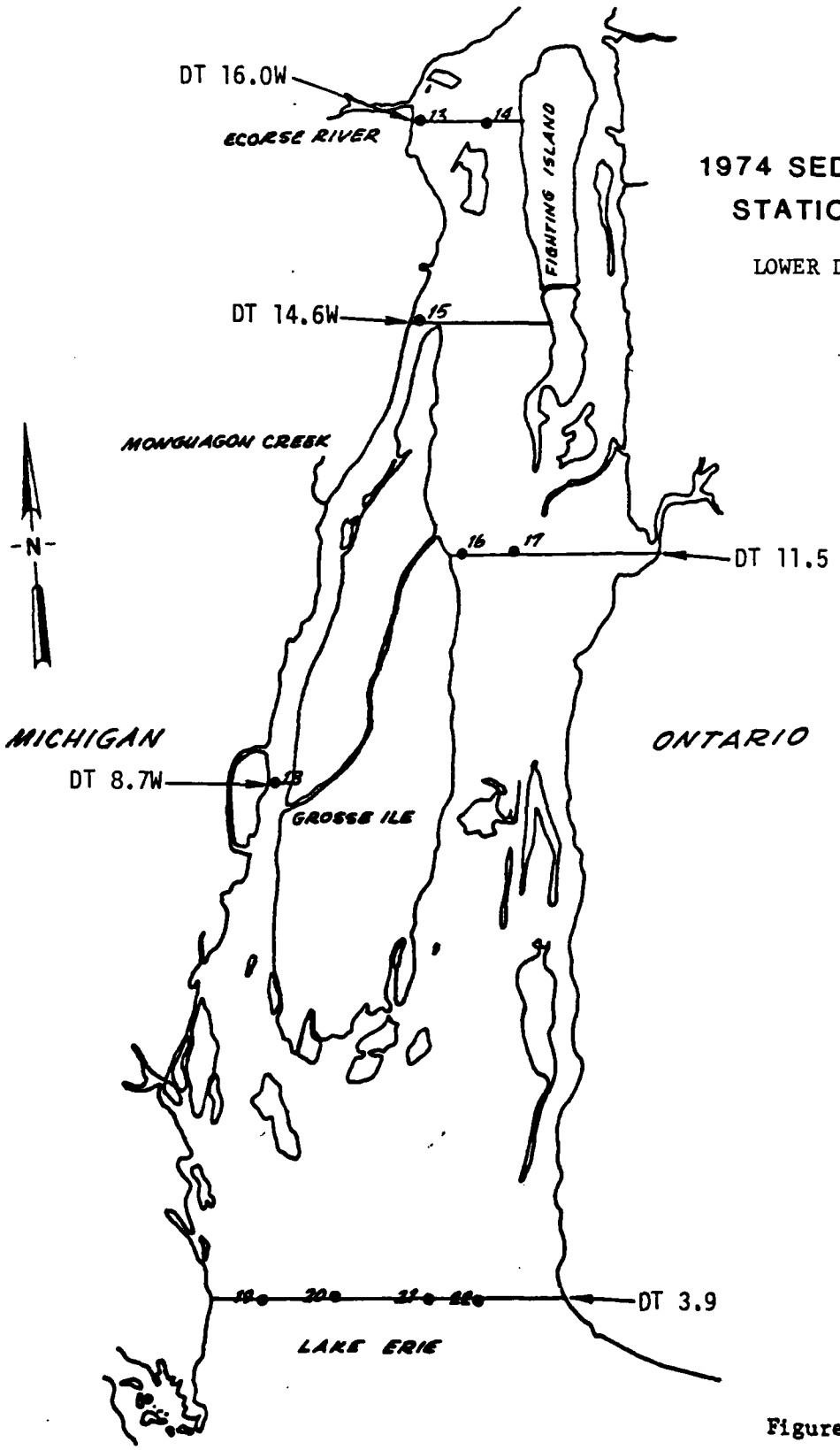
Figure 9



1974 SEDIMENT SAMPLING STATION LOCATIONS

UPPER DETROIT RIVER

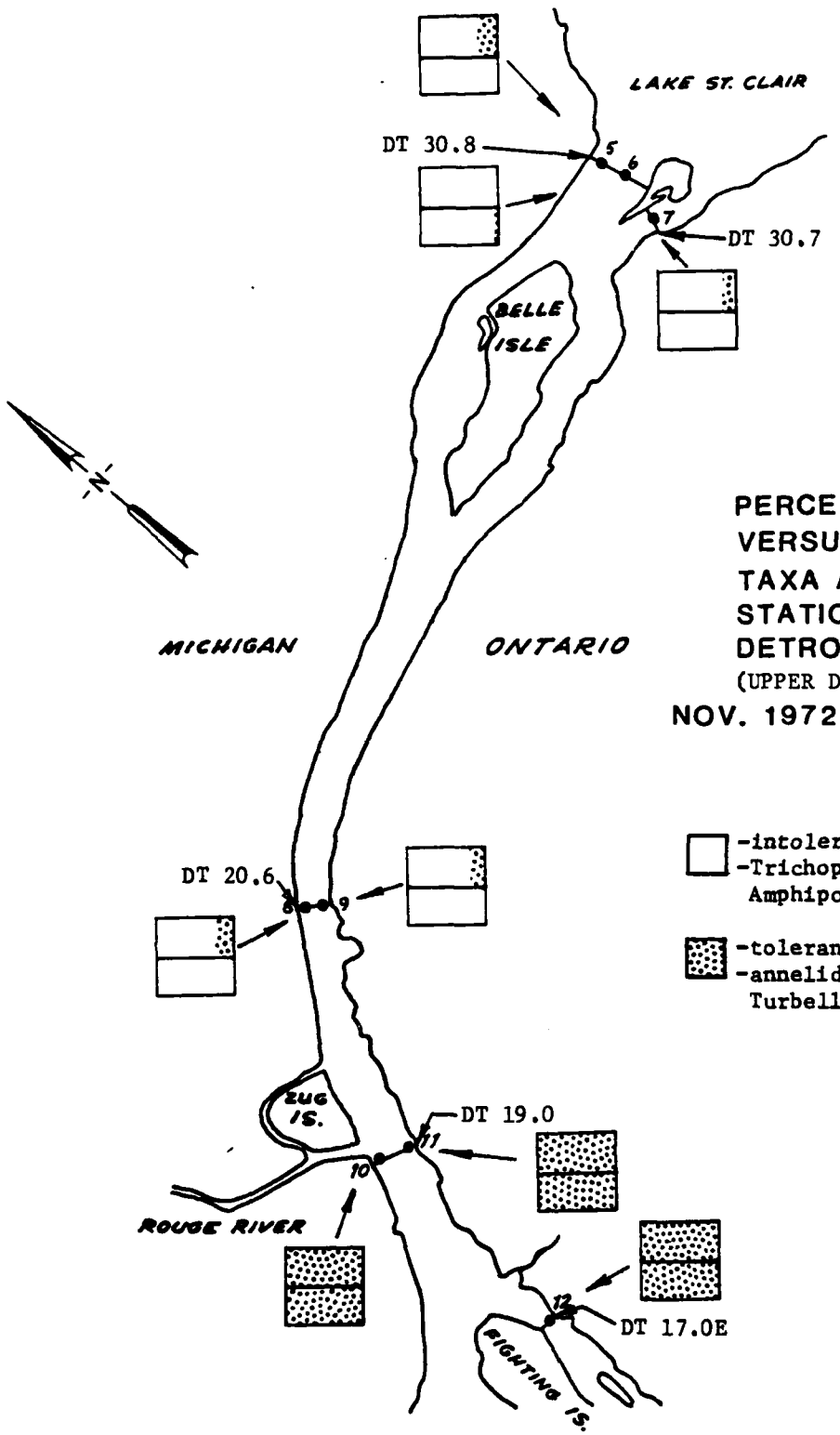
Figure 10



1974 SEDIMENT SAMPLING STATION LOCATIONS

LOWER DETROIT RIVER

Figure 11

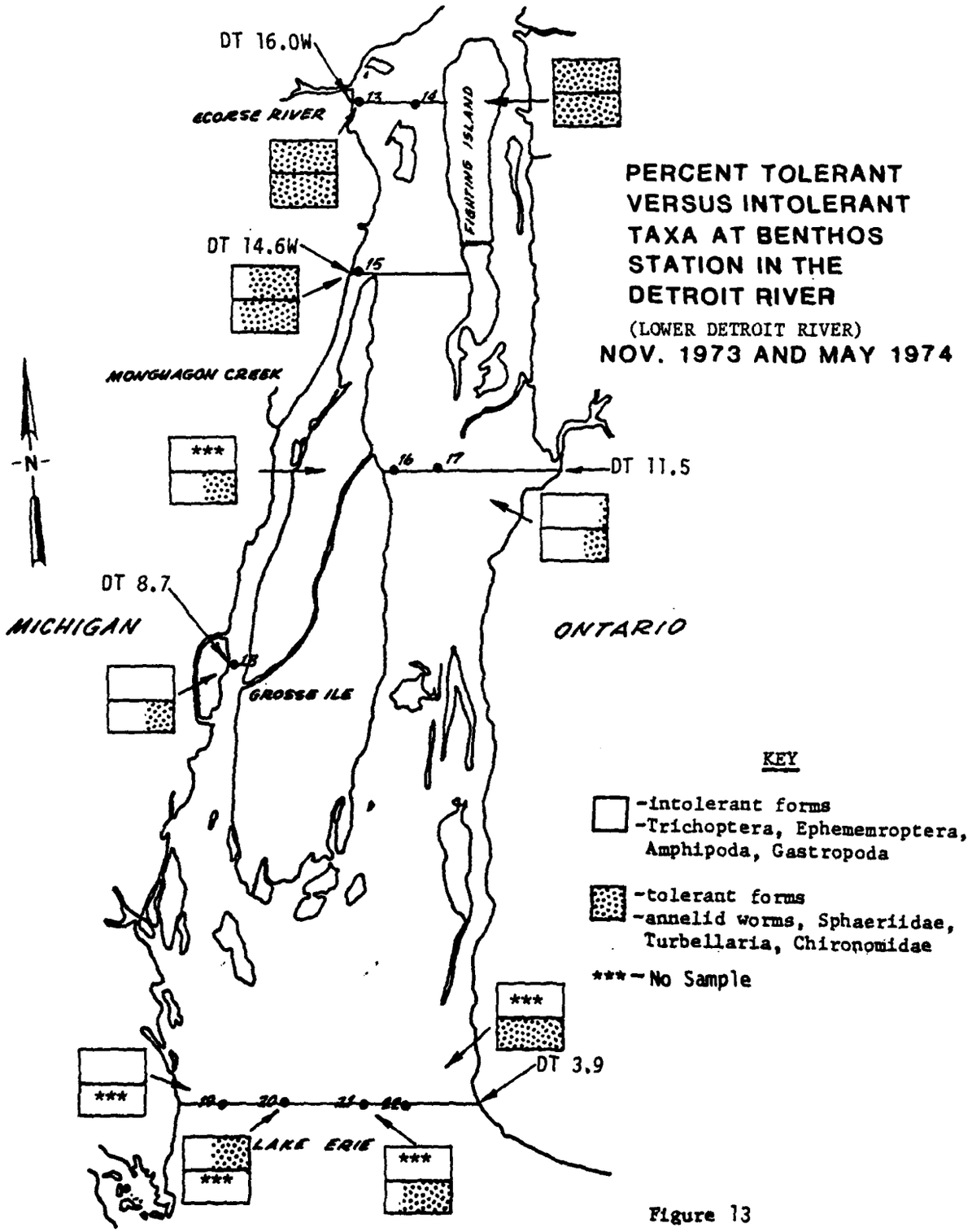


PERCENT TOLERANT VERSUS INTOLERANT TAXA AT BENTHOS STATIONS IN THE DETROIT RIVER
(UPPER DETROIT RIVER)
NOV. 1972 AND MAY 1974

KEY

- -intolerant forms
  -Trichoptera, Ephememroptera, Amphipoda, Gastropoda
- -tolerant forms
  -annelid worms, Sphaeriidae, Turbellaria, Chironomidae

Figure 12



PERCENT TOLERANT VERSUS INTOLERANT TAXA AT BENTHOS STATION IN THE DETROIT RIVER

(LOWER DETROIT RIVER)

NOV. 1973 AND MAY 1974

KEY

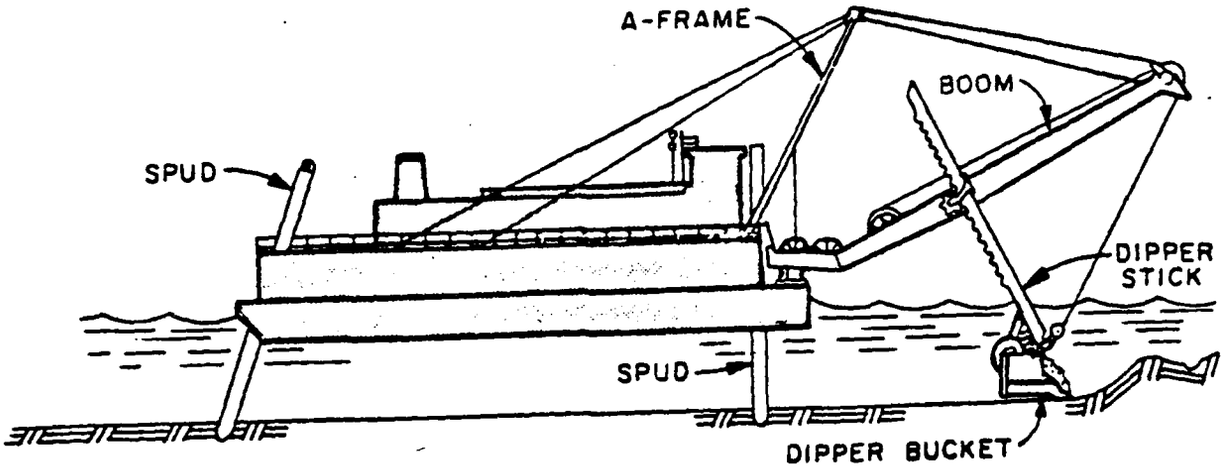
-intolerant forms
-Trichoptera, Ephememroptera, Amphipoda, Gastropoda

-tolerant forms
-annelid worms, Sphaeriidae, Turbellaria, Chironomidae

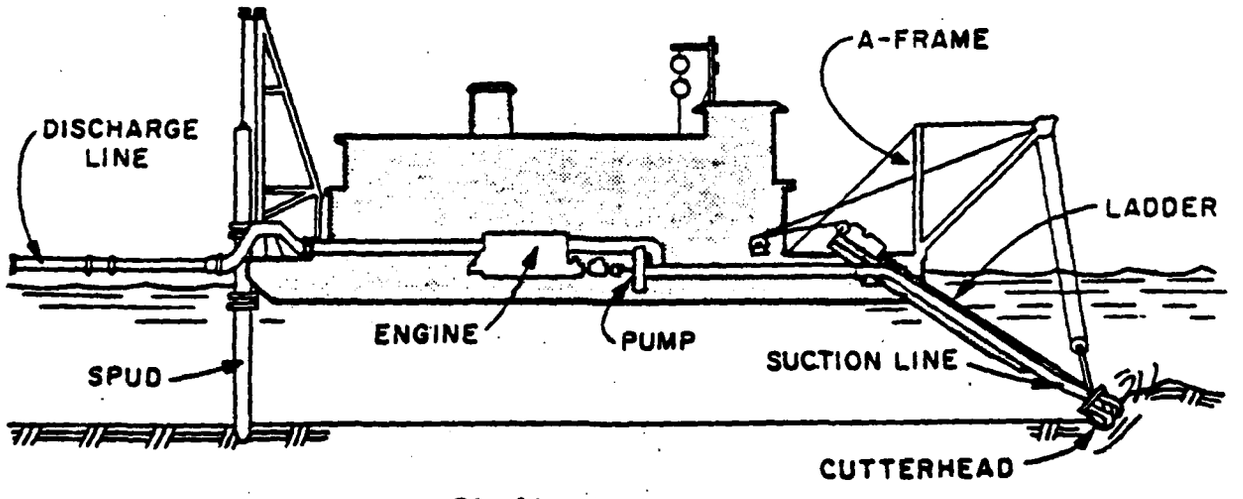
*** - No Sample

Figure 13

DREDGES



Dipper Dredge



Pipeline Dredge

Figure 14

DETROIT RIVER - WATER QUALITY
(1962-1973)

APPENDIX A

APPENDIX A

AVERAGE PHENOL CONCENTRATION - DETROIT RIVER[8] (1962-1973)

DT Station Milepoint	Feet from U.S. Shore	1962-63	1967-69	1971-73
30.8	100	3.5	2.0	1.0
	300	3.5	2.0	1.0
20.6	50	3.7	2.7	1.2
	400	3.5	2.0	1.2
	1000	3.6	2.0	1.2
14.6	100	8.0	5.7	6.7
	400	7.2	4.3	5.9
	1000	4.1	2.0	2.6
12.0W (Trenton Channel)	122	9.0	5.3	5.3
	490	8.2	5.0	4.6
	880	8.5	3.2	3.4
8.7W (Trenton Channel)	80	41.0	21.2	7.4
	480	12.0	6.2	4.8
	980	10.0	4.2	4.6
	1240	7.0	3.7	3.8
3.9	2500	9.5	5.9	5.9
	5500	5.0	3.7	4.0
	7500	3.7	2.3	2.7
	9500	3.2	2.4	1.5
	11500	3.0	2.3	1.0
	15000	3.1	2.1	1.0
	16500	2.7	2.0	1.0
	18500	2.5	2.0	1.1
	19000	2.4	2.0	1.0

Note: all concentrations as ug/l phenol

APPENDIX A (Cont.)

AVERAGE AMMONIA-NITROGEN CONCENTRATIONS - DETROIT RIVER[8]
(1963-1973)

DT Station Milepoint	Feet from U.S. Shore	1963-65	1967-69	1969-71	1971-73
30.8	100	.11	.04	0.7	.05
	300	.14	.03	.04	.04
20.6	50		.03	.05	.05
	400		.03	.05	.05
	1000		.05	.08	.07
12.0	122			.46	.45
(Trenton	490			.16	.19
Channel)	880			.08	.10
8.7W	80		.59	.43	.41
(Trenton	480		.28	.20	.24
Channel)	980		.13	.12	.14
	1240		.11	.11	.11
3.9	2500		.57	.60	.55
	5500		.27	.32	.29
	7500		.17	.22	.17
	9500		.06	.07	.09
	11500		.08	.08	.08
	15000		.04	.03	.05
	16500		.03	.04	.05
	18000		.03	.05	.07

Note: All concentrations are mg/l as Nitrogen

APPENDIX A (Cont.)

AVERAGE NITRATE NITROGEN CONCENTRATIONS - DETROIT RIVER[8]
(1964-1973)

DT Station Milepoint	Feet from U.S. Shore	1964-65	1967-69	1969-71	1971-73
30.8W	100	.23	.12	.12	.13
	300	.22	.14	.11	.10
20.6	50		.09	.11	.17
	400		.10	.12	.16
	1000		.10	.12	.15
14.6	100		.25	.38	.51
	400		.18	.25	.26
	1000		.16	.20	.21
12.0W (Trenton Channel)	122			.26	.31
	490			.20	.26
	880			.17	.24
8.7W (Trenton Channel)	80		.29	.41	.43
	480		.23	.35	.37
	980		.17	.22	.26
	1240		.20	.24	.24
3.9	2500		.34	.64	.63
	5500	.25	.20	.32	.46
	9500	.22	.15	.18	.25
	11500	.21	.15	.20	.22
	15000	.20	.15	.16	.20
	16500	.20	.17	.16	.18
	18500	.26	.20	.19	.23

Note: All concentrations are mg/l Nitrogen

APPENDIX A (Cont.)

AVERAGE TOTAL PHOSPHOROUS CONCENTRATION - DETROIT RIVER[8]
(1968-1972)

DT Station Milepoint	Feet from U.S. Shore	1968-70	1970-72
30.8W	100	.16	.06
	300	.08	.05
20.6	50	.13	.10
	400	.07	.06
	1000	.10	.08
14.6	100	.18	.13
	400	.16	.11
	1000	.09	.07
12.0W (Trenton Channel)	122	.24	.18
	490	.15	.12
	880	.11	.10
8.7 (Trenton Channel)	80	.41	.22
	480	.23	.15
	980	.17	.13
	1240	.16	.12
3.9	2500	.36	.24
	5500	.22	.17
	7500	.15	.13
	9500	.12	.08
	11500	.08	.06
	15000	.07	.05
	16500	.07	.04
	18500	.08	.04

Note: All concentrations as mg/l as Phosphorous

APPENDIX A (Cont.)

AVERAGE TOTAL IRON CONCENTRATIONS - DETROIT RIVER[8]
(1967-1973)

DT Station Milepoint	Feet from U.S. Shore	1967-69	1969-71	1971-73
30.8	100	513	431	264
	300	372	355	297
20.6	50	399	480	415
	400	333	365	278
	1000	311	373	263
14.6	100	854	692	641
	400	614	650	571
	1000	507	493	389
12.0W	122		789	719
(Trenton	490		698	610
Channel)	880		484	490
8.7W	80	1240	1145	918
(Trenton	480	1079	858	642
Channel)	980	733	633	548
	1240	568	581	496
3.9	2500	980	826	706
	5500	804	597	600
	7500	668	526	502
	9500	574	421	421
	11500	538	408	358
	15000	550	376	297
	16500	564	475	354
	18500	643	529	587

Note: All concentrations are ug/l as Iron

APPENDIX A (Cont.)

AVERAGE DISSOLVED SOLIDS CONCENTRATIONS - DETROIT RIVER[8]
(1971-1973)

DT Station Milepoint	Feet from U.S. Shore	1971	1972	1973
30.8	100	133	134	168
	300	127	143	165
20.6	50	129	132	162
	400	123	116	158
	1000	121	119	160
14.6	100	139	151	187
	400	141	150	163
	1000	132	138	152
	2000	131	139	153
12.0W (Trenton Channel)	122	166	175	192
	490	148	148	162
	880	136	149	165
8.7W (Trenton Channel)	80	167	182	193
	480	143	140	168
	980	142	139	167
	1240	137	148	170
3.9	2500	173	192	188
	5500	151	164	163
	7500	140	162	162
	9500	129	153	162
	11500	125	150	157
	14500	130	145	158
	16500	155	197	180
	18500	189	212	218
	19000	230	245	210

BOTTOM SEDIMENT - DETROIT RIVER
(1970, 1973, 1974)

APPENDIX B

APPENDIX B

APPENDIX B

1974 SEDIMENT STATION LOCATIONS

Station No.	River Transect (mile point)	Distance from Western Shore (ft.)	Station Description
5	DT 30.8	100	Detroit River west of Peach Island
6	DT 30.8	1,000	Detroit River west of Peach Island
7	DT 30.7	900	Detroit River east of Peach Island
8	DT 20.6	50	Detroit River app. 3,400 ft. south of Ambassador Bridge
9	DT 20.6	1,000	Detroit River app. 3,400 ft. south of Ambassador Bridge
10	DT 19.0	100	Detroit River at mouth of Rouge River
11	DT 19.0	2,500	Detroit River at mouth of Rouge River
12	DT 17.0 E	900	Detroit River at east side of head of Fighting Island
13	DT 16.0 W	100	Detroit River below mouth of Ecorse River
14	DT 16.0 W	4,000	Detroit River below mouth of Ecorse River
15	DT 14.6 W	100	Detroit River west side of tip of Grosse Ile
16	DT 11.5	1,200	Detroit River east of Grosse Ile at mouth Rivier Aux Canards
17	DT 11.5	4,000	Detroit River east of Grosse Ile at mouth Rivier Aux Canards
18	DT 8.7	80	Detroit River in Trenton Channel at Elizabeth Park
19	DT 3.9	2,500	Mouth of Detroit River
20	DT 3.9	5,500	Mouth of Detroit River
21	DT 3.9	13,000	Mouth of Detroit River
22	DT 3.9	16,500	Mouth of Detroit River

APPENDIX B

QUALITATIVE DESCRIPTIONS OF ODORS*

Code	Nature of Odor	Description (such as odors of:)
A	Aromatic (spicy)	camphor, cloves, lavender, lemon
Ac	cucumber	Synura
B	Balsamic (flowery)	geranium, violet, vanilla
Bg	geranium	Asterionella
Bn	nasturtium	Aphanizomenon
Bs	sweetish	Coelosphaerium
Bv	violet	Mallomonas
C	Chemical	industrial wastes or treatment chemicals
Cc	chlorinous	free chlorine
Ch	hydrocarbon	oil refinery wastes
Cm	medicinal	phenol and idoform
Cs	sulfuretted	hydrogen sulfide
D	Disagreeable	(pronounced, unpleasant)
Df	fishy	Uroglenopsis, Dinobryon
Dp	pigpen	Anabaena
Ds	septic	stale sewage
E	Earthy	damp earth
Ep	peaty	peat
G	Grassy	crushed grass
M	Musty	decomposing straw
Mm	moldy	damp cellar
V	Vegetable	root vegetables

*Standard Methods of Examination of Water & Wastewater, 11th Edition, p. 255.

APPENDIX B

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Depth (ft.)	Year Sampled	Lab. No.	Sediment Description				Temp. °C
				Color	Odor[c]	Oil	Percent Composition	
Trenton Channel								
[a]13.1	20	1973	15800	-	-	-	--	7.5
[a]13.0	13	1973	15801	-	-	-	--	7.5
[a]12.9	15	1973	15802	-	-	-	--	7.5
[a]12.6	13	1973	15803	-	-	-	--	7.0
11.4	27	1973	15508	dark gray	Ch, E	yes	sand 90, mud 10	6.5
	5	1970	-	black	Ch, Ds	yes	ooze 80, sand 10, gravel 5, pebbles 5	-
[a]11.0	31	1973	15804	-	-	-	--	7.0
10.2	25	1970	-	black	Ch	yes	sand 90, iron ore dust 10	-
9.3	30	1973	15509	dark gray	none	yes	sand 50, gravel 25, pebbles 25	6.5
8.9	9	1973	15511	brown	Df, Cs	yes	mud 45, silt 25, sand 15, ooze 10	6.0
	5	1970	-	black	Ds	yes	ooze 50, organic material 50	-
8.6	28	1973	15510	dark gray	Ch	yes	clay 50, sand 25, stones 25	6.0
Amherstburg Channel								
7.3	28	1973	15503	light brown	none	no	sand 90, stones 10	5.5
6.3	28	1973	15502	brownish	none	yes	sand 70, white silt 20, pebbles 10	5.5
	24	1973	-	dark gray	Ds	yes	sand 75, silt 20, lime slurry 5	-

[a] Mercury Study
[b] Data from EPA
[c] See Attachment - page B-2

AD-A107 370 CORPS OF ENGINEERS DETROIT MI DETROIT DISTRICT F/G 13/2
MAINTENANCE DREDGING OF THE FEDERAL NAVIGATION CHANNELS IN THE --ETC(U)
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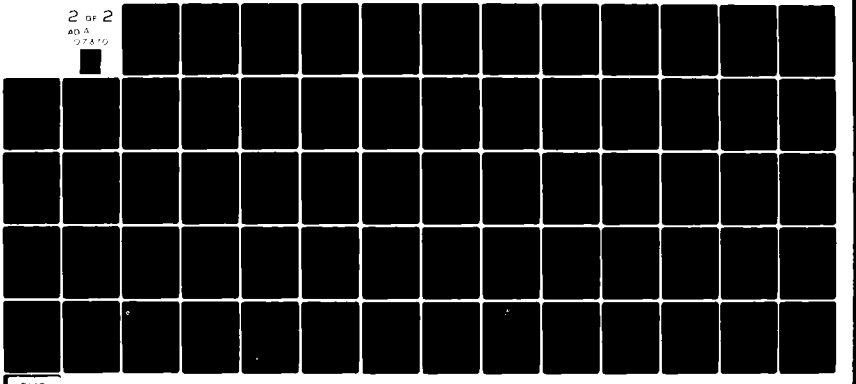

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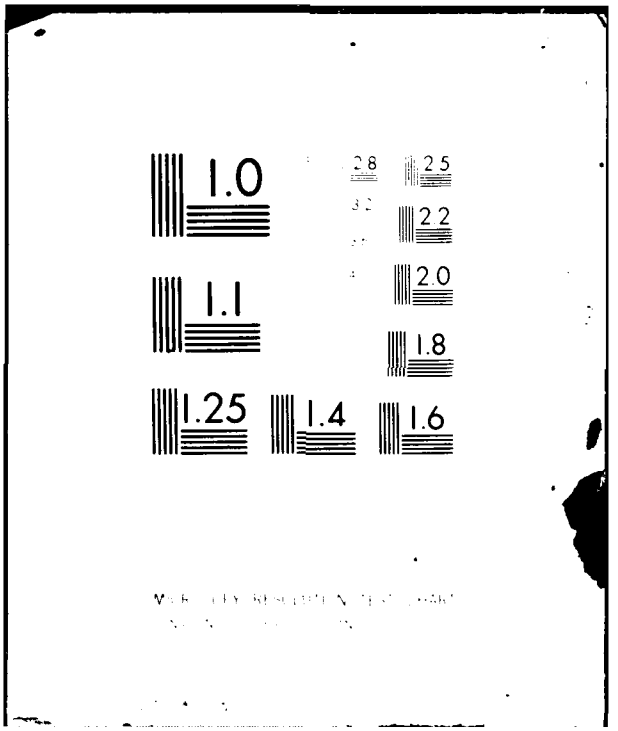
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1.1
1.25
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2.0
2.2
2.5

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Solids (percent)		COD (mg/kg)		Phenol (mg/kg)		Tot. Kjeldahl Nitrogen (mg/kg)		Total Phos. (mg/kg)		Oil & Grease (mg/kg)	
		Total	Tot. Vol.	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Trenton Channel													
[a]13.1	1973	76.4											
[a]13.0	1973	43.0											
[a]12.9	1973	51.9											
[a]12.6	1973	74.6											
11.4	1973	72.3	3.4	4000	55000	.190	.260	540	750	520	720	320	400
	1970	69.9	3.5	46000	66000	.120	.170	-	-	660	940	890	1300
[a]11.0	1973	38.1	-	-	-	-	-	-	-	-	-	-	-
10.2	1970	67.5	7.1	64000	95000	.270	.400	-	-	830	1200	1500	2200
9.3	1973	72.4	3.6	33000	46000	<.096	<.130	540	740	450	620	490	680
8.9	1973	60.4	8.2	77000	127000	.450	.740	890	1500	1500	2500	3400	5600
	1970	33.0	11.9	69000	210000	.660	2.00	-	-	1100	3300	8200	25000
8.6	1973	73.5	3.6	56000	76000	.250	.340	450	610	660	900	1100	1500
Amherstburg Channel													
7.3	1973	78.0	1.5	9600	12000	<.096	<.120	90	120	150	190	120	150
6.3	1973	58.8	5.0	48000	82000	.096	.160	54	92	190	320	260	440
	1970	67.1	4.3	45000	67000	.160	.240	-	-	170	250	240	360
EPA Criteria Concentration Limits			6.0		50000				1000				1500

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Total Iron (mg/kg)		Lead (mg/kg)		Nickel (mg/kg)		Molybdenum (mg/kg)		Zinc (mg/kg)		Total Iron manually (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Trenton Channel													
[a]13.1	1973												
[a]13.0	1973												
[a]12.9	1973												
[a]12.6	1973												
11.4	1973	11000	15000	29	40	39	54	< 4	< 6	180	250	14000	19000
	1970	16000	23000	-	-	-	-	-	-	-	-	-	-
[a]11.0	1973												
10.2	1970	28000	41000	-	-	-	-	-	-	-	-	-	-
9.3	1973	11000	15000	26	36	53	73	< 4	< 6	190	260	14000	19000
8.9	1973	16000	26000	64	100	54	89	< 4	< 6	260	430	23000	38000
	1970	17000	52000	-	-	-	-	-	-	-	-	-	-
8.6	1973	20000	27000	52	71	54	73	< 4	< 5	320	440	26000	35000
Amherstburg Channel													
7.3	1973	5100	6500	17	22	13	17	< 4	< 5	45	58	6100	7800
6.3	1973	4800	8200	20	34	13	22	< 4	< 7	45	76	6300	11000
	1970	8000	12000	-	-	-	-	-	-	-	-	-	-
EPA Criteria Concentration Limits					50						50		

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Arsenic (mg/kg)		Cadmium (mg/kg)		Total Chromium (mg/kg)		Cobalt (mg/kg)		Copper (mg/kg)		Manganese (mg/kg)		Mercury (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Trenton Channel															
[a]13.1	1973													-	.85
[a]13.0	1973													-	1.8
[a]12.9	1973													-	2.8
[a]12.6	1973													-	1.6
11.4	1973	-	-	1.6	2.2	26	36	6.4	8.8	40	55	240	330	-	-
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.4	.6
[a]11.0	1973	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
10.2	1970	-	-	-	-	-	-	-	-	-	-	-	-	1.9	2.8
9.3	1973	-	-	1.6	2.2	22	30	8.8	12	32	44	300	410	-	-
8.9	1973	-	-	3.2	5.3	76	120	6.4	10	46	76	250	410	-	-
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.8	2.4
8.6	1973	-	-	3.2	4.4	28	38	8.8	12	52	71	400	540	-	-
Amherstburg Channel															
7.3	1973	-	-	.8	1.0	13	17	7.2	9.2	10	13	140	180	-	-
6.3	1973	-	-	.8	1.4	9.6	16	4.0	6.8	26	44	100	170	-	-
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.2	.3
EPA Criteria Concentration Limits															1.0

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Depth (ft.)	Year Sampled	Lab. No.	Sediment Composition				Temp. °C
				Color	Odor[c]	Oil	Percent Composition	
Livingstone - East Outer Channel								
9.2	28	1973	15603	brown-gray	Df	no	sand 50, clay 20, gravel 20, silt 5, stones 5	5.5
	37	1970	-	brown	M	yes	sand 59, silt 40, pebbles 1	-
4.4	21	1973	15600	gray-brown	none	no	clay 50, sand 25, gravel 20, pebbles 5	5.5
	38	1970	-	brown	Df	no	sand 40, gravel 20, pebbles 20, stones 15, silt 5	-
3.8N-0.2E	18	1973	74-4263	gray-brown	none	no	ooze 100	22.0
	22	1970	-	dark gray	Dp, Ds	yes	ooze 100	-
1.5N-0.0E	18	1973	74-4264	gray	none	yes	ooze 100	21.0
	22	1970	-	brown, dk. gray	Ds, Ch	yes	ooze 100	-
0.3N-0.2E	18	1973	74-4265	gray-brown	none	yes	ooze 100	22.0
	24	1970	-	dark brown	Ds, Ch	yes	ooze 99, shells 1	-
1.0S-0.2E	21	1973	74-4266	gray-brown	-	-	ooze 90, sand 10	22.0
	23	1970	-	black	Ds, Ch	yes	ooze 98, cinders 2	-
2.4S-1.1E	25	1973	74-4267	gray	none	yes	ooze 100	21.0
	30	1970	-	black	Ds, Ch	yes	ooze 100	-
3.4S-1.1E	25	1973	74-4270	gray	none	no	ooze 100	21.0
	28	1970	-	black brown	Ds, Ch	yes	ooze 100	-
Dumping Grounds - West of East Outer Channel								
1.9S-0.0E	22	1973	74-4269	gray	Ch	yes	ooze 50, clay 50	22.0
	25	1970	-	dark brown	Ds, Ch	yes	ooze 99, shells 1	-
3.4S-0.0E	24	1973	74-4268	gray	none	yes	ooze 100	21.0
	29	1970	-	black	Ds, Ch	yes	ooze 98, cinders 2	-

[a] Mercury Study
[b] Data from EPA
[c] See Attachment - page B-2

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Solids (percent)		COD (mg/kg)		Phenol (mg/kg)		Tot. Kjeldahl Nitrogen (mg/kg)		Total Phos. (mg/kg)		Oil & Grease (mg/kg)	
		Total	Tot. Vol.	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Livingstone - East Outer Channel													
9.2	1973	75.6	2.1	26000	34000	<.096	<.130	-	-	250	330	280	370
	1970	78.1	1.6	26000	33000	.240	.310	-	-	420	540	660	850
4.4	1973	75.0	1.8	18000	24000	<.096	<.130	420	560	240	320	160	210
	1970	76.8	3.4	33000	43000	.240	.310	-	-	-	-	-	-
3.8N-0.2E	1973	54.26	5.71	41000	76000	.200	.369	790	1500	530	970	920	1700
	1970	48.9	6.7	38000	78000	.470	.960	-	-	503	1100	1900	3900
1.5N-0.0E	1973	41.44	8.02	42000	100000	.300	.724	1100	2700	440	1100	1000	2500
	1970	51.0	7.8	52000	100000	.260	.510	-	-	1000	2000	3100	6100
0.3N-0.2E	1973	51.28	6.43	46000	90000	.070	.137	940	1800	480	940	2700	5300
	1970	49.0	8.2	45000	92000	.300	.610	-	-	570	1200	2700	5500
1.0S-0.2E	1973	48.38	7.14	42000	87000	.400	.827	990	2000	590	1200	1100	2300
	1970	55.6	7.6	59000	110000	.620	1.100	-	-	800	1400	2500	4500
2.4S-1.1E	1973	43.74	8.11	58000	130000	.700	1.600	1100	2500	710	1600	1800	4100
	1970	40.4	7.8	45000	110000	.300	.740	-	-	920	2300	3400	8400
3.4S-1.1E	1973	41.30	7.97	50000	120000	.200	.484	1100	2700	460	1100	3300	8000
	1970	47.2	8.0	44000	93000	.270	.570	-	-	700	1500	3100	6600
Dumping Grounds - West of East Outer Channel													
1.9S-0.0E	1973	54.83	6.71	48000	88000	2.800	5.107	1300	2400	330	600	2000	3600
	1970	53.6	6.6	51000	95000	.580	1.10	-	-	920	1700	3500	6500
3.4S-0.0E	1973	40.32	7.70	50000	120000	.300	.744	950	2400	330	600	1900	4700
	1970	43.5	6.9	42000	97000	.150	.340	-	-	480	1100	2300	5300
EPA Criteria Concentration Limits			6.0		50000				1000				1500

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Total Iron (mg/kg)		Lead (mg/kg)		Nickel (mg/kg)		Molybdenum (mg/kg)		Zinc (mg/kg)		Total Iron manually (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Livingstone - East Outer Channel													
9.2	1973	8600	11000	18	24	11	14	<4	< 5	54	71	12000	16000
	1970	16000	20000	-	-	-	-	-	-	-	-	-	-
4.4	1973	6700	8900	8	11	8	11	<4	< 5	26	35	9200	12000
	1970	-	-	-	-	-	-	-	-	-	-	-	-
3.8N-0.2E	1973	14400	26500	61	112	45	82	-	-	170	310	-	-
	1970	14000	29000	-	-	-	-	-	-	-	-	-	-
1.5N-0.0E	1973	14300	34600	68	165	35	83	-	-	180	430	-	-
	1970	20000	39000	-	-	-	-	-	-	-	-	-	-
0.3N-0.2E	1973	14300	29700	59	115	34	65	-	-	116	230	-	-
	1970	16000	33000	-	-	-	-	-	-	-	-	-	-
1.0S-0.2E	1973	14200	29400	69	143	64	132	-	-	220	430	-	-
	1970	14000	25000	-	-	-	-	-	-	-	-	-	-
2.4S-1.1E	1973	17300	39600	78	179	63	144	-	-	230	530	-	-
	1970	18000	45000	-	-	-	-	-	-	-	-	-	-
3.4S-1.1E	1973	14100	34080	76	184	29	71	-	-	130	310	-	-
	1970	16000	34000	-	-	-	-	-	-	-	-	-	-
Dumping Grounds - West of East Outer Channel													
1.9S-0.0E	1973	16500	30000	59	108	38	70	-	-	48	90	-	-
	1970	18000	34000	-	-	-	-	-	-	-	-	-	-
3.4S-0.0E	1973	14500	36200	70	194	48	119	-	-	200	500	-	-
	1970	12000	28000	-	-	-	-	-	-	-	-	-	-
EPA Criteria Concentration Limits					50						50		

[a] Mercury Study
[b] Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

DT Station No.	Year	Arsenic (mg/kg)		Cadmium (mg/kg)		Total Chromium (mg/kg)		Cobalt (mg/kg)		Copper (mg/kg)		Manganese (mg/kg)		Mercury (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
Livingstone - East Outer Channel															
9.2	1973	-	-	.8	1.0	11	14	4.8	6.3	13	17	180	240		
	1970	-	-	-	-	-	-	-	-	-	-	-	-	<.2	<.2
4.4	1973	-	-	.8	1.1	8	11	5.6	7.5	8	11	130	170	-	-
	1970	-	-	-	-	-	-	-	-	-	-	-	-	<.2	<.2
3.8N-0.2E	1973	3.8	7.0	3	5	66	122	13.5	24.9	<15	<24	248	457	.8	1.4
	1970	-	-	-	-	-	-	-	-	-	-	-	-	1.3	2.6
1.5N-0.0E	1973	3.2	7.8	3	7	70	169	9.9	23.9	<15	<31	225	543	<.5	<1.0
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.9	1.8
0.3N-0.2E	1973	3.9	8.0	3	6	62	121	13.3	25.9	16	33	214	417	.5	1.0
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.5	1.0
1.0S-0.2E	1973	3.8	7.4	5	9	70	146	11.3	23.4	<15	<25	228	471	<.5	<1.0
	1970	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.8
2.4S-1.1E	1973	3.4	7.8	5	11	92	211	10.2	23.3	17	39	234	535	<.5	<1.0
	1970	-	-	-	-	-	-	-	-	-	-	-	-	1.0	2.5
3.4S-1.1E	1973	3.4	8.2	4	10	80	193	9.7	23.5	<15	<35	225	545	.8	2.0
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.7	1.5
Dumping Grounds - West of East Outer Channel															
1.9S-0.0E	1973	4.3	7.8	4	7	63	115	16.1	29.4	<15	<26	267	487	.5	.9
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.9	1.7
3.4S-0.0E	1973	3.5	8.8	3	7	95	236	13.6	33.7	17	42	226	560	.7	1.7
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.7	1.5
EPA Criteria Concentration Limits															1.0

[a] Mercury Study
[b] Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River (Cont.)

DT Station No.	Depth (ft.)	Year Sampled	Lab. No.	Sediment Description				Temp. °C
				Color	Odor[c]	Oil	Percent Composition	
[a]6.7	8	1973	15805	-	-	-	--	8.0
[a]3.9	13	1973	15850	-	-	-	--	7.0
(19)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
(20)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
(21)	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
Ballards Reef								
12.2	15	1973	15507	brown	none	no	sand 50, clay 50	5.5
	6	1970	-	dark gray	F	no	sand 50, clay 25, mud 15, gravel 10	-
11.5 (16)	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
(17)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
11.1	30	1973	15506	brown	Df	no	sand 95, stones 5	5.5

[a] Mercury Study
[b] Data from EPA
[c] See Attachment - page B-2

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River (Cont.)

DT Station No.	Year	Solids (percent)		COD (mg/kg)		Phenol (mg/kg)		Tot. Kjeldahl Nitrogen (mg/kg)		Total Phos. (mg/kg)		Oil & Grease (mg/kg)	
		Total	Tot. Vol.	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
[a]6.7	1973	68.3	-	-	-	-	-	-	-	-	-	-	-
[a]3.9	1973	32.2	-	-	-	-	-	-	-	-	-	-	-
(19)	1973	-	15.7	-	197000	-	-	-	1340	-	10000	-	-
	1973	-	11.9	-	148000	-	-	-	1450	-	3730	-	-
	1974	-	5.6	-	86000	-	-	-	980	-	1740	-	-
(20)	1973	-	6.8	-	20000	-	-	-	380	-	3420	-	-
	1973	-	11.4	-	109000	-	-	-	1770	-	1440	-	-
	1974	-	10.7	-	76000	-	-	-	1580	-	1350	-	-
(21)	1973	-	9.1	-	48000	-	-	-	750	-	1090	-	-
	1974	-	3.4	-	40000	-	-	-	630	-	430	-	-
Ballards Reef													
12.2	1973	75.0	1.6	19000	25000	<.096	< .130	65	87	290	390	130	170
	1970	75.4	2.0	17000	23000	.130	.095	-	-	270	360	160	210
11.5 (16)	1973	-	4.3	-	31000	-	-	-	610	-	610	-	-
	1974	-	8.1	-	85000	-	-	-	1470	-	700	-	-
(17)	1973	-	9.0	-	27000	-	-	-	450	-	890	-	-
	1973	-	8.4	-	32000	-	-	-	870	-	1180	-	-
	1974	-	12.1	-	86000	-	-	-	2280	-	670	-	-
11.1	1973	76.6	.6	10000	13000	<.096	< .120	77	100	150	200	120	160
EPA Criteria Concentration Limits			6.0		50000				1000				1500

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River (Cont.)

DT Station No.	Year	Total Iron (mg/kg)		Lead (mg/kg)		Nickel (mg/kg)		Molybdenum (mg/kg)		Zinc (mg/kg)		Total Iron manually (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
[a]6.7	1973												
[a]3.9	1973												
(19)	1973	-	31600	-	160	-	87	-	-	-	404	-	-
	1973	-	21400	-	125	-	73	-	-	-	350	-	-
	1974	-	13200	-	84	-	37	-	-	-	284	-	-
(20)	1973	-	10200	-	52	-	39	-	-	-	266	-	-
	1973	-	20700	-	101	-	57	-	-	-	266	-	-
	1974	-	20200	-	80	-	44	-	-	-	278	-	-
(21)	1973	-	13600	-	41	-	31	-	-	-	149	-	-
	1974	-	6800	-	29	-	15	-	-	-	84	-	-
Ballards Reef													
12.2	1973	8000	11000	13	17	10	13	< 4	< 5	40	53	9600	13000
	1970	8700	12000	-	-	-	-	-	-	-	-	-	-
11.5 (16)	1973	-	11200	-	17	-	26	-	-	-	56	-	-
	1974	-	13300	-	42	-	30	-	-	-	101	-	-
(17)	1973	-	6700	-	25	-	15	-	-	-	63	-	-
	1973	-	22800	-	30	-	45	-	-	-	90	-	-
	1974	-	14700	-	17	-	29	-	-	-	49	-	-
11.1	1973	5100	6600	9.6	12	6.4	8.4	< 4	< 5	37	48	7100	9300
EPA Criteria Concentration Limits					50						50		

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River (Cont.)

DT Station No.	Year	Arsenic (mg/kg)		Cadmium (mg/kg)		Total Chromium (mg/kg)		Cobalt (mg/kg)		Copper (mg/kg)		Manganese (mg/kg)		Mercury (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
[a]6.7	1973	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
[a]3.9	1973	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8
(19)	1973	-	-	-	10.0	-	795	-	-	-	88	-	720	-	-
	1973	-	-	-	8.2	-	217	-	-	-	92	-	540	-	2.32
	1974	-	-	-	4.6	-	48	-	-	-	69	-	330	-	.58
(20)	1973	-	-	-	3.4	-	328	-	-	-	35	-	260	-	-
	1973	-	-	-	7.5	-	180	-	-	-	55	-	480	-	.97
	1974	-	-	-	8.5	-	56	-	-	-	32	-	480	-	.42
(21)	1973	-	-	-	3.2	-	186	-	-	-	19	-	490	-	-
	1974	-	-	-	2.1	-	9	-	-	-	12	-	230	-	.17
Ballards Reef															
12.2	1973	-	-	.8	1.1	8.8	12	6.4	8.5	9.6	13	210	280	-	-
	1970	-	-	-	-	-	-	-	-	-	-	-	-	.3	.4
11.5 (16)	1973	-	-	-	2.3	-	61	-	-	-	14	-	480	-	-
	1974	-	-	-	2.8	-	15	-	-	-	19	-	390	-	.4
(17)	1973	-	-	-	1.2	-	41	-	-	-	12	-	300	-	-
	1973	-	-	-	2.7	-	55	-	-	-	12	-	960	-	.86
	1974	-	-	-	2.3	-	13	-	-	-	9	-	300	-	< .01
11.1	1973	-	-	.8	1.0	4.0	5.2	4.8	6.3	4.0	5.2	130	170	-	-
EPA Criteria Concentration Limits:															1.0

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River

DT Station No.	Depth (ft.)	Year Sampled	Lab. No.	Sediment Description				Temp. °C
				Color	Odor[c]	Oil	Percent Composition	
30.8 (5)	-	1973	-	-	-	-	--	-
(6)	-	1973	-	-	-	-	--	-
30.7 (7)	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
20.6 (8)	-	1973	-	-	-	-	--	-
(9)	-	1974	-	-	-	-	--	-
19.0 (10)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
17.0 (12)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
16.0 (13)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
(14)	-	1973	-	-	-	-	--	-
	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-
14.6 (15)	-	1973	-	-	-	-	--	-
	-	1974	-	-	-	-	--	-

[a] Mercury Study
[b] Data from EPA
[c] See Attachment - page B-2

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River

DT Station No.	Year	Solids (percent)		COD (mg/kg)		Phenol (mg/kg)		Tot. Kjeldahl Nitrogen (mg/kg)		Total Phos. (mg/kg)		Oil & Grease (mg/kg)	
		Total	Tot. Vol.	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
30.8 (5)	1973	-	9.6	-	13000	-	-	-	310	-	850	-	-
(6)	1973	-	5.1	-	19000	-	-	-	310	-	540	-	-
30.7 (7)	1973	-	3.6	-	9000	-	-	-	450	-	600	-	-
	1974	-	3.0	-	14000	-	-	-	420	-	660	-	-
20.6 (8)	1973	-	7.4	-	52000	-	-	-	620	-	860	-	-
(9)	1974	-	3.6	-	5000	-	-	-	360	-	690	-	-
19.0 (10)	1973	-	12.2	-	157000	-	-	-	1400	-	2090	-	-
	1973	-	6.7	-	109000	-	-	-	960	-	790	-	-
	1974	-	14.1	-	120000	-	-	-	1060	-	1590	-	-
17.0 (12)	1973	-	2.4	-	11000	-	-	-	270	-	500	-	-
	1973	-	7.7	-	35000	-	-	-	650	-	780	-	-
	1974	-	6.8	-	88000	-	-	-	1740	-	1020	-	-
16.0 (13)	1973	-	21.0	-	209000	-	-	-	5010	-	7010	-	-
	1973	-	5.5	-	110000	-	-	-	1000	-	2910	-	-
	1974	-	8.0	-	51000	-	-	-	660	-	1100	-	-
(14)	1973	-	4.7	-	28000	-	-	-	650	-	810	-	-
	1973	-	5.8	-	31000	-	-	-	590	-	520	-	-
	1974	-	5.1	-	73000	-	-	-	670	-	660	-	-
14.6 (15)	1973	-	7.0	-	37000	-	-	-	570	-	930	-	-
	1974	-	9.7	-	36000	-	-	-	530	-	930	-	-
EPA Criteria Concentration Limits			6.0		50000				1000				1500

[a] Mercury Study
[b] Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River

DT Station No.	Year	Total Iron (mg/kg)		Lead (mg/kg)		Nickel (mg/kg)		Molybdenum (mg/kg)		Zinc (mg/kg)		Total Iron manually (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
30.8 (5)	1973	-	13100	-	15	-	32	-	-	-	81	-	-
(6)	1973	-	12500	-	30	-	31	-	-	-	70	-	-
30.7 (7)	1973	-	8200	-	13	-	17	-	-	-	39	-	-
	1974	-	17700	-	21	-	30	-	-	-	49	-	-
20.6 (8)	1973	-	8200	-	108	-	20	-	-	-	86	-	-
(9)	1974	-	17400	-	16	-	29	-	-	-	47	-	-
19.0 (10)	1973	-	36900	-	242	-	47	-	-	-	424	-	-
	1973	-	15200	-	58	-	43	-	-	-	131	-	-
	1974	-	29100	-	152	-	37	-	-	-	601	-	-
17.0 (12)	1973	-	5500	-	29	-	13	-	-	-	88	-	-
	1973	-	15200	-	29	-	36	-	-	-	69	-	-
	1974	-	11600	-	54	-	59	-	-	-	214	-	-
16.0 (13)	1973	-	38600	-	384	-	289	-	-	-	444	-	-
	1973	-	21200	-	144	-	95	-	-	-	335	-	-
	1974	-	18200	-	339	-	43	-	-	-	225	-	-
(14)	1973	-	7800	-	14	-	14	-	-	-	40	-	-
	1973	-	7100	-	29	-	20	-	-	-	67	-	-
	1974	-	8600	-	38	-	22	-	-	-	124	-	-
14.6 (15)	1973	-	15000	-	29	-	38	-	-	-	70	-	-
	1974	-	15100	-	29	-	41	-	-	-	124	-	-
EPA Criteria Concentration Limits					50						50		

[a]Mercury Study
[b]Data from EPA

APPENDIX B (Cont.)

BOTTOM SEDIMENT SAMPLE ANALYSIS[b]
DETROIT RIVER
(1970, 1973, 1974)

Detroit River

DT Station No.	Year	Arsenic (mg/kg)		Cadmium (mg/kg)		Total Chromium (mg/kg)		Cobalt (mg/kg)		Copper (mg/kg)		Manganese (mg/kg)		Mercury (mg/kg)	
		Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B	Wet B	Dry B
30.8 (5)	1973	-	-	-	1.5	-	87	-	-	-	10	-	420	-	-
(6)	1973	-	-	-	2.1	-	30	-	-	-	14	-	380	-	.5
30.7 (7)	1973	-	-	-	.7	-	47	-	-	-	4	-	260	-	-
	1974	-	-	-	2.6	-	16	-	-	-	14	-	480	-	.19
20.6 (8)	1973	-	-	-	1.5	-	55	-	-	-	45	-	330	-	-
(9)	1974	-	-	-	3.1	-	14	-	-	-	14	-	500	-	.20
19.0 (10)	1973	-	-	-	11.9	-	473	-	-	-	161	-	1090	-	-
	1973	-	-	-	3.5	-	47	-	-	-	21	-	580	-	4.12
	1974	-	-	-	3.3	-	32	-	-	-	78	-	1120	-	.39
17.0 (12)	1973	-	-	-	.9	-	33	-	-	-	9	-	210	-	-
	1973	-	-	-	2.9	-	40	-	-	-	13	-	550	-	8.00
	1974	-	-	-	3.1	-	39	-	-	-	20	-	340	-	.31
16.0 (13)	1973	-	-	-	16.2	-	2680	-	-	-	199	-	730	-	-
	1973	-	-	-	5.3	-	166	-	-	-	103	-	510	-	.43
	1974	-	-	-	4.1	-	36	-	-	-	47	-	480	-	.78
(14)	1973	-	-	-	.7	-	42	-	-	-	5	-	210	-	-
	1973	-	-	-	2.1	-	33	-	-	-	14	-	120	-	.17
	1974	-	-	-	2.6	-	22	-	-	-	30	-	230	-	.20
14.6 (15)	1973	-	-	-	2.7	-	40	-	-	-	15	-	560	-	.18
	1974	-	-	-	3.3	-	26	-	-	-	19	-	550	-	.03
EPA Criteria Concentration Limits															1.0

[a] Mercury Study
[b] Data from EPA

WATER QUALITY STANDARDS

STATE OF MICHIGAN

APPENDIX C

APPENDIX C

APPENDIX C

DEPARTMENT OF NATURAL RESOURCES

WATER RESOURCES COMMISSION

GENERAL RULES

Filed with Secretary of State, December 1974.

These rules take effect 15 days after filing with the Secretary of State.

(By authority conferred on the water resources commission by sections 2 and 5 of Act No. 245 of the Public Acts of 1929, as amended, being sections 323.2 and 323.5 of the Michigan Compiled Laws.)

Part 4. Water Quality Standards, is added to the General Rules of the commission to read as follows:

PART 4. WATER QUALITY STANDARDS

R 323.1041. Purpose

Rule 1041. It is the purpose of the water quality standards as prescribed by these rules to establish water quality requirements applicable to the Great Lakes, their connecting waterways and all other surface waters of the state, which shall protect the public health and welfare, enhance and maintain the quality of water, serve the purposes of United States Public Law 92-500 and the commission act; and which shall protect the quality of waters for recreational purposes, public and industrial water supplies, agriculture uses, navigation and propagation of fish, other aquatic life and wildlife.

R 323.1043. Definitions A to N.

Rule 1043. As used in this part:

(a) "Agricultural water use" means a use of water for agricultural purposes, including but not limited to livestock watering, irrigation and crop spraying.

(b) "Application factor" means a numerical factor applied to the TL_m, or concentration producing other effect end points to provide the concentration of a toxic substance that would be safe for test organisms in the waters of the state.

(c) "Best practicable waste treatment technology for control of total phosphorus" means chemical-physical or chemical-physical-biological treatment processes, including but not limited to treatment with aluminum salts, iron salts or lime in conjunction with appropriate coagulant chemicals, settling or filtration or both, with operation and management of the treatment facilities and the process to achieve optimum phosphorus removal rates, or equivalent treatment.

(d) "Anadromous salmonids" means those trout and salmon which ascend streams to spawn.

(e) "Coldwater fish" means those fish species whose populations thrive in relatively cold water, including but not limited to trout, salmon, whitefish and cisco.

(f) "Connecting waterways" means the St. Marys River, Keweenaw waterway, Detroit River, St. Clair River and Lake St. Clair.

(g) "Designated use" means a use of the waters of the state as established by these rules, including but not limited to industrial, agricultural and public water supply; recreation; fish, other aquatic life and wildlife; and navigation.

(h) "Dissolved oxygen" means the amount of oxygen dissolved in water, commonly expressed as a concentration in terms of milligrams per liter.

(i) "Dissolved solids" means the amount of materials dissolved in water commonly expressed as a concentration in terms of milligrams per liter.

(j) "Effluent" means a wastewater discharged from a point source to the waters of the state.

(k) "Fecal coliform" means a type of coliform bacteria found in the intestinal tract of humans and other warm-blooded animals.

(l) "Fish, other aquatic life and wildlife use" means the use of the waters of the state by fish, other aquatic life and wildlife for any life history stage or activity.

(m) "Industrial water supply" means a water source not protected for public water supply and intended for use in commercial or industrial applications and non-contact food processing.

(n) "Mixing zone" means a region of a water body which receives a wastewater discharge of a different quality than the receiving waters, and within which the water quality standards as prescribed by these rules do not apply.

(o) "Natural water temperature" means the temperature of a body of water without an influence from an artificial source, or a temperature as otherwise determined by the commission.

R 323.1044. Definitions P to W

Rule 1044. As used in this part:

(a) "Palatability" means the state of being agreeable or acceptable to the senses of sight, taste or smell.

(b) "Plant nutrients" means those chemicals, including but not limited to nitrogen and phosphorus, necessary for the growth and reproduction of aquatic rooted, attached and floating plants, fungi or bacteria.

(c) "Point source" means a discernible, confined and discrete conveyance, from which wastewater is or may be discharged to the waters of the state including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, concentrated animal feeding operation or vessel or other floating craft.

(d) "Public water supply" means a surface raw water source which, after conventional treatment, will provide a safe, clear, potable and aesthetically pleasing water for uses which include but are not limited to human consumption, food processing and cooking and as a liquid ingredient in foods and beverages.

(e) "Raw water" means the waters of the state prior to any treatment.

(f) "Receiving waters" means the waters of the state into which an effluent is or may be discharged.

(g) "Sanitary sewage" means treated or untreated wastewaters which contain human metabolic and domestic wastes.

(h) "Standard" means a definite numerical value or narrative statement promulgated by the commission to enhance or maintain water quality to provide for and fully protect a designated use of the waters of the state.

(i) "Suspended solids" means the amount of material suspended in water, commonly expressed as a concentration in terms of milligrams per liter.

(j) "TL_m" means median tolerance limit which is the concentration of a test material in a suitable diluent at which 50% of the exposed organisms survive for a specified period of exposure.

(k) "Total body contact recreation" means an activity where the human body may come into direct contact with water to the point of complete submergence, including but not limited to activities such as swimming, water skiing and skin diving.

(l) "Toxic substance" means a substance of unnatural origin, except heat, in concentrations or combinations which are or may become harmful to plant or animal life.

(m) "Warmwater fish" means those fish species whose populations thrive in relatively warm water, including but not limited to bass, pike, walleye and panfish.

(n) "Wastewater" means liquid waste resulting from commercial, municipal and domestic operations and industrial processes, including but not limited to cooling and condensing waters, sanitary sewage and industrial waste.

(o) "Waters of the state" means the Great Lakes, their connecting waterways, all inland lakes, rivers, streams, impoundments, open drains and other surface watercourses within the confines of the state, except drainage ways and ponds used solely for wastewater conveyance, treatment or control.

R 323.1050. Suspended solids.

Rule 1050. All waters of the state shall contain no unnatural turbidity, color, oil films, floating solids, foams, settleable solids or deposits in quantities which are or may become injurious to any designated use.

R 323.1051. Dissolved solids.

Rule 1051. (1) The addition of any dissolved solids shall not exceed concentrations which are or may become injurious to any designated use. Point sources containing dissolved solids shall be considered by the commission on a case-by-case basis and increases of dissolved solids in the waters of the state shall be limited through the application of best practicable control technology currently available as prescribed by the administrator of the United States environmental protection agency pursuant to section 304 (b) of United States Public Law 92-500, except that in no instance shall total dissolved solids in the waters of the state exceed a concentration of 500 milligrams per liter as a monthly average nor more than 750 milligrams per liter at any time, as a result of controllable point sources.

(2) In addition to the standards prescribed by subrule (1), waters of the state used for public water supply shall, at the point of water intake, not exceed the permissible inorganic and organic chemicals criteria for raw public water supply in "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968," except chlorides. For the Great Lakes and connecting waters, chlorides shall, at the point of water intake, not exceed 50 milligrams per liter as a monthly average. For all other waters of the state, chlorides shall, at the point of water intake, not exceed 125 milligrams per liter as a monthly average.

R 323.1053. Hydrogen ion concentration.

Rule 1053. The hydrogen ion concentration expressed as pH shall be maintained within the range of 6.5 to 8.8 in all waters of the state except as otherwise prescribed by rule 1080. Any artificially induced variation in the natural pH shall remain within this range and shall not exceed 0.5 units of pH.

R 323.1055. Taste and odor producing substances.

Rule 1055. The waters of the state shall contain no unnatural substances in concentrations which are or may become injurious to their use for public, industrial or agricultural water supply, or in concentrations which lower the palatability of fish as measured by test procedures acceptable to the commission.

R 323.1057. Toxic substances.

Rule 1057. (1) Toxicity of undefined toxic substances not specifically included in subrules (2) and (3) shall be determined by development of 96 hour TL_m's or other appropriate effect end points obtained by continuous-flow or *in situ* bioassays using suitable test organisms. Concentrations of undefined toxic substances in the waters of the state shall not exceed safe concentrations as determined by applying an application factor, based on knowledge of the behavior of the toxic substances and the organisms to be protected in the environment, to the TL_m or other appropriate effect end point.

(2) For all waters of the state, unless on the basis of recent information a more restrictive limitation is required to protect a designated use, concentrations of defined toxic substances, including heavy metals, shall be limited by application of the toxic substances recommendations contained in the chapter on Freshwater Organisms, "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968," or

by application of any toxic effluent standard, limitation or prohibition promulgated by the administrator of the United States environmental protection agency pursuant to section 307 (a) of the United States Public Law 92-500, whichever is more restrictive.

(3) In addition to the standards prescribed in subrules (1) and (2), waters of the state used for public water supply shall, at the point of water intake, not exceed the permissible inorganic and organic chemicals criteria for raw public water supply in "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968," except that chlorides shall be limited to the same extent as prescribed by rule 1051(2).

R 323.1058. Radioactive substances.

Rule 1058. The control and regulation of radioactive substances discharged to the waters of the state shall be in accordance with and subject to the criteria, standards or requirements prescribed by the United States atomic energy commission as set forth in the applicable Code of Federal Regulations, Title 10, Part 20.

R 323.1060. Plant nutrients.

Rule 1060. Nutrients originating from domestic, industrial, municipal or domestic animal sources shall be limited to the extent necessary to prevent stimulation of growths of aquatic rooted, attached and floating plants, fungi or bacteria which are or may become injurious to the designated uses of the waters of the state. Phosphorus which is or may readily become available as a plant nutrient shall be controlled from point source discharges by the application of methods utilizing best practicable waste treatment technology for control of total phosphorus, with the goal of achieving a monthly average effluent concentration of one milligram per liter as P.

R 323.1062. Fecal coliform.

Rule 1062. (1) Waters of the state protected for total body contact recreation shall contain not more than 200 fecal coliforms per 100 milliliters; and all other waters of the state shall contain not more than 1,000 fecal coliforms per 100 milliliters. These concentrations may be exceeded if due to uncontrollable non-point sources.

(2) Compliance with the fecal coliform standards prescribed by subrule (1) shall be determined on the basis of the geometric average of any series of 5 or more consecutive samples taken over not more than a 30-day period.

R 323.1064. Dissolved oxygen; Great Lakes, connecting waterways and inland streams.

Rule 1064. A minimum of 6 milligrams per liter of dissolved oxygen in all Great Lakes and connecting waterways shall be maintained and, except for inland lakes as prescribed in rule 1065, a minimum of 6 milligrams per liter of dissolved oxygen shall be maintained at all times in all inland streams designated by these rules to be protected for coldwater fish. In all other waters, except for inland lakes as prescribed by rule 1065, a minimum of 5 milligrams per liter of dissolved oxygen shall be maintained as a daily average and no single value shall be less than 4 milligrams per liter in waters naturally capable of supporting warmwater fish.

R 323.1065. Dissolved oxygen; inland lakes.

Rule 1065. (1) The following standards for dissolved oxygen shall apply to inland lakes capable of supporting coldwater fish:

(a) In warmwater inland lakes with little water exchange which are capable of sustaining a cold stratum of well-oxygenated water throughout the summer above a hypolimnion with very little oxygen, a minimum of 6 milligrams

per liter of dissolved oxygen shall be maintained throughout the epilimnion and the upper one-third of the thermocline during the entire summer stagnation period. At all other times, the dissolved oxygen concentration shall be maintained at natural levels.

(b) In inland lakes capable of sustaining high oxygen values throughout the hypolimnion during periods of stagnation, dissolved oxygen concentrations greater than 6 milligrams per liter shall be maintained throughout the entire lake.

(c) In inland lakes which serve a principal anadromous fish migration routes, dissolved oxygen concentrations greater than 5 milligrams per liter shall be maintained throughout the epilimnion and the upper one-third of the thermocline in stratified lakes throughout the periods of fish migration. In unstratified lakes, dissolved oxygen concentrations greater than 5 milligrams per liter shall be maintained throughout the entire lake during periods of fish migration.

(d) In shallow, unstratified coldwater inland lakes, dissolved oxygen concentrations greater than 6 milligrams per liter shall be maintained throughout the entire lake.

(2) The following standards for dissolved oxygen shall apply to inland lakes capable of supporting warmwater fish.

(a) In warmwater lakes with little water exchange, dissolved oxygen concentrations greater than 5 milligrams per liter shall be maintained throughout the epilimnion and the upper one-third of the thermocline during the entire summer stagnation period. At all other times, dissolved oxygen concentrations shall be maintained at natural levels.

(b) In warmwater lakes with a high rate of water exchange, dissolved oxygen concentrations greater than 5 milligrams per liter shall be maintained

throughout the epilimnion and the upper one-third of the thermocline during the summer stagnation period. At all other times, dissolved oxygen concentrations greater than 5 milligrams per liter shall be maintained except in areas where natural oxygen depressions occur.

R 323.1069. Temperature; general considerations.

Rule 1069. (1) In all waters of the state, the points of temperature measurement normally shall be in the surface 1 meter; however, where turbulance, sinking plumes, discharge inertia or other phenomena upset the natural thermal distribution patterns of receiving waters, temperature measurements shall be required to identify the spatial characteristics of the thermal profile.

(2) Monthly maximum temperatures, based on the ninetieth percentile occurrence of natural water temperatures plus the increase allowed at the edge of the mixing zone and in part on long-term physiological needs of fish, may be exceeded for short periods when natural water temperatures exceed the ninetieth percentile occurrence. Temperature increases during these periods may be permitted by the commission, but in all cases shall not be greater than the natural water temperature plus the increase allowed at the edge of the mixing zone.

(3) Natural daily and seasonal temperature fluctuations of the receiving waters shall be preserved.

R 323.1070. Temperature; Great Lakes and connecting waterways.

Rule 1070. (1) The Great Lakes and connecting waterways shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 3 degrees Fahrenheit above the existing natural water temperature.

(2) The Great Lakes and connecting waterways shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures in degrees Fahrenheit higher than the following monthly maximum temperatures:

(a) Lake Michigan north of a line due west from the city of Pentwater:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	40	50	55	70	75	75	75	65	60	45

(b) Lake Michigan south of a line due west from the city of Pentwater:

J	F	M	A	M	J	J	A	S	O	N	D
45	45	45	55	60	70	80	80	80	65	60	50

(c) Lake Superior and the St. Marys River:

J	F	M	A	M	J	J	A	S	O	N	D
38	36	39	46	53	61	71	74	71	61	49	42

(d) Lake Huron north of a line due east from Tawas Point:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	40	50	60	70	75	80	75	65	55	45

(e) Lake Huron south of a line due east from Tawas Point, except Saginaw Bay:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	40	55	60	75	80	80	80	65	55	45

(f) Lake Huron, Saginaw Bay:

J	F	M	A	M	J	J	A	S	O	N	D
45	45	45	60	70	75	80	85	78	65	55	45

(g) St. Clair River:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	40	50	60	70	75	80	75	65	55	50

(h) Lake St. Clair:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	45	55	70	75	80	83	80	70	55	45

(i) Detroit River:

J	F	M	A	M	J	J	A	S	O	N	D
40	40	45	60	70	75	80	83	80	70	55	45

(j) Lake Erie:

J	F	M	A	M	J	J	A	S	O	N	D
45	45	45	60	70	75	80	85	80	70	60	50

R 323.1072. Temperature: inland lakes, general standards.

Rule 1072. Inland lakes shall not receive a heat load which would:

(a) Increase the temperature of the thermocline or hypolimnion or decrease the volume thereof.

(b) Increase the temperature of the receiving waters at the edge of the mixing zone more than 3 degrees Fahrenheit above the existing natural water temperature.

(c) Increase the temperature of the receiving waters at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:

J	F	M	A	M	J	J	A	S	O	N	D
45	45	50	60	70	75	80	85	80	70	60	50

R 323.1073. Temperature; inland lakes, anadromous salmonid migrations.

Rule 1073. Warmwater inland lakes which serve as principal migratory routes for anadromous salmonids shall not receive a heat load during periods of migration at such locations and in a manner which may adversely affect salmonid migration or raise the receiving water temperature at the edge of the mixing zone more than 3 degrees Fahrenheit above the existing natural water temperature.

R 323.1074. Impoundments.

Rule 1074. (1) River and stream standards as prescribed by rule 1075 shall apply to all impoundments.

(2) The commission shall determine, when necessary, whether a body of water shall be considered as an inland lake or an impoundment for the purpose of these rules. This determination shall be made partially on the basis of aquatic life resources to be protected.

R 323.1075. Temperature; rivers and streams.

Rule 1075. (1) Rivers and streams naturally capable of supporting coldwater fish shall not receive a heat load which would:

(a) Increase the temperature of the receiving waters at the edge of the mixing zone more than 2 degrees Fahrenheit above the existing natural water temperature.

(b) Increase the temperature of the receiving waters at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:

J	F	M	A	M	J	J	A	S	O	N	D
38	38	43	54	65	68	68	68	63	56	48	40

(2) Rivers and streams naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone more than 5 degrees Fahrenheit above the existing natural water temperature.

(3) Rivers and streams naturally capable of supporting warmwater fish shall not receive a heat load which would warm the receiving water at the edge of the mixing zone to temperatures greater than the following monthly maximum temperatures:

(a) Rivers and streams north of a line between Bay City, Midland, Alma and North Muskegon:

J	F	M	A	M	J	J	A	S	O	N	D
38	38	41	56	70	80	83	81	74	64	49	39

(b) Rivers and streams south of a line between Bay City, Midland, Alma and North Muskegon, except the St. Joseph River:

J	F	M	A	M	J	J	A	S	O	N	D
41	40	50	63	76	84	85	85	79	68	55	43

(c) St.. Joseph River:

J	F	M	A	M	J	J	A	S	O	N	D
50	50	55	65	75	85	85	85	85	70	60	50

(4) Non-trout rivers and streams that serve as principal migratory routes for anadromous salmonids shall not receive a heat load during periods of migration at such locations and in a manner which may adversely affect salmonid migration or raise the receiving water temperature at the edge of the mixing zone more than 5 degrees Fahrenheit above the existing natural water temperature.

R 323.1080. Special conditions.

Rule 1080. To be consistent with the agreement between the United States of America and Canada on Great Lakes water quality effective April 15, 1972, the following conditions shall apply to the Michigan waters of the Great Lakes and their connecting waterways:

(a) Values of pH shall not be outside the range of 6.7 to 8.5.

(b) In Lake Erie, the level of total dissolved solids shall not be greater than 200 milligrams per liter.

(c) Filtrable iron shall not be greater than 0.3 milligrams per liter.

R 323.1082. Mixing zones.

Rule 1082. (1) A mixing zone to achieve a mixture of a point source discharge with the receiving waters shall be considered a region in which organism response to water quality characteristics is time-dependent. Exposure in mixing zones shall not cause an irreversible response which results in deleterious effects to populations of important aquatic life and wildlife. As a minimum restriction to the toxic substance 96 hour TL_m for important species

of fish or fishfood organisms shall not be exceeded in the mixing zone at any point inhabitable by these organisms, unless it can be demonstrated to the commission that a higher concentration is acceptable. The mixing zone at any transect of a stream shall contain not more than 25% of the cross-sectional area or volume of flow of the stream or both unless it can be demonstrated to the commission that designation of a greater area or volume of streamflow will allow passage of fish and fishfood organisms so that effects on their immediate and future populations are negligible or not measurable. Watercourses or portions thereof which, without one or more point source discharges, would have no flow except during periods of surface runoff may be considered as a mixing zone for a point source discharge. For Lake Michigan, mixing zones shall not exceed a defined area equivalent to that of a circle of radius of 1,000 feet unless the discharger can demonstrate to the commission that the defined area for a thermal discharge is more stringent than necessary to assure the protection and propagation of a balanced indigenous population of aquatic life and wildlife in the receiving water.

(2) All mixing zones established by the commission pursuant to subrule (1) shall be determined on a case-by-case basis.

R 323.1090. Application of water quality standards.

Rule 1090. (1) The water quality standards prescribed by these rules for the various designated uses of the waters of the state apply to receiving waters and are not to be considered applicable to wastewater effluents. The water quality standards shall not apply within defined mixing zones, except for those standards prescribed in rule 1050 for settleable solids, deposits, floating solids and oil films.

(2) The accepted design streamflow to which the water quality standards as prescribed by these rules shall apply are those equal to or exceeding the 10-year recurrance of a minimum low flow average of 7-day duration, except where the commission determines that a more restrictive application is necessary to protect a particular designated use.

R 323.1091. Designated use interruption.

Rule 1091. Protection of the waters of the state designated for total body contact recreation by the water quality standards prescribed by these rules may be subject to temporary interruption during or following flood conditions or uncontrollable accidents to a sewer or wastewater treatment system. In the event of such an occurrence, full public notice thereof shall be served by the commission to those affected thereby and immediate corrective action shall be required by the commission.

R 323.1092. Dredging.

Rule 1092. The water quality standards prescribed by these rules shall not apply to dredging or construction activities within water areas where such activities occur or during the periods of time when the after effects of dredging or construction activities degrade water quality within such water areas, if the dredging operations or construction have been authorized by the United States army corps of engineers or the department. The water quality standards shall apply, however, in non-confined water areas utilized for the disposal of spoil from dredging operations, except within spoil disposal sites specifically defined by the United States army corps of engineers or the department.

R 323.1096. Determinations of compliance.

Rule 1096. Analysis of the waters of the state to determine compliance with the water quality standards prescribed by these rules shall be made according to procedures outlined in the current edition of "Standard Methods for the Examination of Water and Wastewater" as published jointly by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, or other methods prescribed or approved by the commission and the United States environmental protection agency.

R 323.1097. Chemical applications.

Rule 1097. The application of chemicals for water resource management projects in accordance with and subject to state statutory provisions is not subject to the standards prescribed by these rules, but all projects shall be reviewed and approved by the commission prior to chemical applications.

R 323.1098. Nondegradation and water quality improvement.

Rule 1098. (1) Waters of the state in which the existing water quality is better than the water quality standards prescribed by these rules on the date when the standards become effective, shall not be lowered in quality by action of the commission unless and until it has been affirmatively demonstrated to the commission that a change in quality will not become injurious to the public health, safety or welfare; or become injurious to domestic, commercial, industrial, agricultural, recreational or other uses which are being made of the waters; or become injurious to livestock, wild animals, birds, aquatic life or plants, or the growth or propagation thereof be prevented or injuriously affected; or whereby the value of fish or game may be destroyed or impaired, and that a lowering in quality will not be unreasonable and against the public interest in view of the existing conditions in any waters of the state.

(2) Waters of the state which do not meet the water quality standards prescribed by these rules shall be improved to meet those standards. Where the water quality of certain waters of the state do not meet the water quality standards as a result of natural causes or conditions, no further reduction of water quality by controllable point and non-point sources shall be permitted.

ENVIRONMENTAL PROTECTION AGENCY

BOTTOM SEDIMENT CRITERIA

APPENDIX D

APPENDIX D

APPENDIX D

CRITERIA FOR DETERMINING ACCEPTABILITY OF DREDGED SPOIL DISPOSAL TO THE NATION'S WATERS

Use of Criteria

These criteria were developed as guidelines for EPA, WQO evaluation of proposals and applications to dredge sediments from fresh and saline waters.

Criteria

The decision whether to oppose plans for disposal of dredged spoil in U. S. waters must be made on a case-by-case basis after considering all appropriate factors; including the following:

(a) Volume of dredged material
(b) Existing and potential quality and use of the water in the disposal area
(c) Other conditions at the disposal site such as depth and currents
(d) Time of year of disposal (in relation to fish migration and spawning, etc.)
(e) Method disposal and alternatives
(f) Physical, chemical, and biological characteristics of the dredged material
(g) Likely recurrence and total number of disposal requests in a receiving water area
(h) Predicted long and short-term effects on receiving water quality

When concentrations, in sediments, of <u>one or more</u> of the following pollution parameters exceed the limits expressed below, the sediment will be considered polluted in all cases and, therefore, unacceptable for open water disposal.

Sediments in Fresh and Marine Waters	Conc. Percent (dry wt. basis)	mg/kg
Total Volatile Solids*	6.0	-
Chemical Oxygen Demand (COD)	5.0	50,000
Total Kjeldahl Nitrogen	0.10	1,000
Oil-Grease	0.15	1,500
Mercury	0.0001	1
Lead	0.005	50
Zinc	0.005	50

*When analyzing sediments dredged from marine waters, the following correlation between volatile solids and COD should be made:

T.V.S. % (dry) = 1.32 + 0.98 (COD %).

If the results show a significant deviation from this equation, additional samples should be analyzed to insure reliable measurements.

The total volatile solids and COD analyses should be made first. If the maximum limits are exceeded, the sample can be characterized as polluted and the additional parameters would not have to be investigated. Dredged sediment having concentrations of constitutents less than the limits stated above will not be automatically considered acceptable for disposal.

In addition to the analyses required to determine compliance with the stated numerical criteria, the following additional tests are recommended where appropriate and pertinent:

Total Phosphorus
Total Organic Carbon (TOC)
Immediate Oxygen Demand (IOD)
Settleability
Sulfides

Trace Metals (iron, cadmium, copper, chromium, arsenic, and nickel)

Pesticides

Bioassay

The first 4 analyses would be considered desirable in almost all instances. They may be added to the mandatory list when sufficient experience with their interpretation is gained. For example, as experience is gained, the TOC test may prove to be a valid substitute for the total volatile solids and COD analyses. Tests for trace metals and pesticides should be made where significant concentrations of these materials are expected from known waste discharges.

All analyses and techniques for sample collection, preservation, and preparation shall be in accord with a current EPA, WQO analytical manual on sediments.

No attempt at this time was made to evaluate the qualitative criteria (a) through (h).

PUBLIC NOTICE

APPENDIX E

APPENDIX E

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1027
DETROIT, MICHIGAN 48231

REPLY REFER TO

NCECO-O-3-D

PUBLIC NOTICE

21 August 1974

DERRICKBOAT MAINTENANCE WORK, DETROIT RIVER

1. The U. S. Army Corps of Engineers is performing annual maintenance by derrickboat in those portions of the Federal navigation channels in the Detroit River which require the removal of hard obstructions. This does not include dredging of the silt and fine sand shoal material from those sections of the river which the Environmental Protection Agency has classified as having polluted bottom sediments. Of the approximately 4,000 cubic yards of material, principally rock, about one-third is disposed of in deep water outside and adjacent to the section of the channel from which it was removed. The remaining two-thirds is placed on land, primarily on the project compensating dikes for maintenance and repair thereof. (See attached drawing)

2. This channel maintenance work is being reviewed under the following laws:

Federal Water Pollution Control Act of 1972, the National Environmental Policy Act of 1969, the Fish and Wildlife Act of 1956, the Marine Protection Research and Sanctuaries Act of 1972, the Endangered Species Act of 1973, as well as the various Congressional Acts authorizing construction and maintenance of the Federal project.

This derrickboat work is now underway, and is expectedto take place annually in subsequent years, in the following hard bottom channels in the Detroit River: Fighting Island, Ballards Reef, Amherstburg Channel, Upper Livingstone Channel and Lower Trenton Channel. The material is placed on the deck of the derrickboat which is then towed by tug to the disposal site, where the material is off-loaded by the derrick.

3. The removal of such obstructions is essential to the safe navigation of all domestic and foreign deep draft vessels sailing between Lake Erie and all Ports on the Detroit River, St. Clair River, Lake Huron, Lake Michigan, St. Marys River and Lake Superior. U. S. Waterborne Commerce on the Detroit River in 1972 was about 119,000,000 tons of cargo.

4. Copies of this notice are being sent to the Environmental Protection Agency, the Department of Interior, the Department of Commerce, the Coast Guard, the State of Michigan, Wayne County, the City of Detroit, and other Federal, State and Local agencies, as well as to known interested groups and individuals.

5. A preliminary determination has been made that an Environmental Impact Statement will be prepared, but it is not yet completed. However, the necessity of maintaining these hard bottom channels for the large volume of International waterborne commerce vital to the overall public interest requires that the derrickboat work continue concurrently with the preparation of that statement.

6. Any person who has an interest which may be affected by the disposal of this dredged material may request a public hearing. The request must be submitted in writing to the District Engineer within thirty (30) days of the date of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

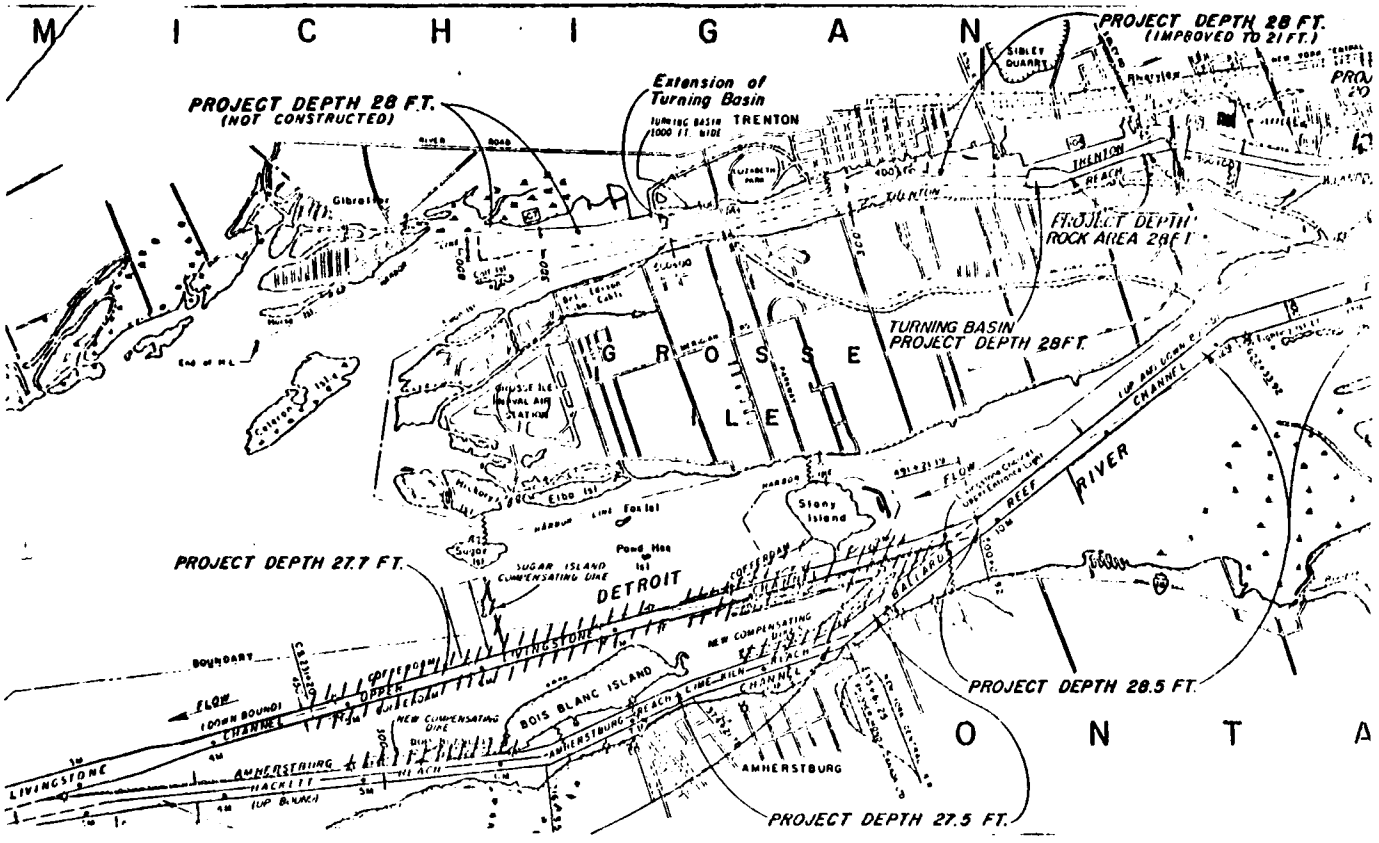
7. Designation of the proposed disposal site for dredged material associated with the Federal project shall be made through the application of guidelines promulgated by the Administrator EPA in conjunction with the Secretary of the Army. If these guidelines alone prohibit the designation of these proposed disposal sites, any potential impairment to the maintenance of navigation, including any economic impact on navigation and anchorage which would result from the failure to use this disposal site, will also be considered.

8. This notice is being published in conformance with 33 US Code of Federal Regulations 209.145. Any interested parties desiring to express their views concerning the proposed disposal may do so by filing their comments in writing with this office not later than 4:30 P. M., 30 days from date of issuance of this notice.

JAMES E. HAYS
Colonel, Corps of Engineers
District Engineer

Notice to Postmasters:

It is requested that the above notice be conspicuously and continuously posted for 30 days from the date of issuance of this notice.



DERRICKBOAT MAINTENANCE

Project dikes on which material is placed.

DETROIT RIVER, MICHIGAN

U S ARMY ENGINEER DISTRICT DETROIT

Figure 1

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 South Dearborn Street
CHICAGO, ILLINOIS 60604

December 11, 1974

District Engineer
U. S. Army Engineer District, Detroit
Post Office Box 1027
Detroit, Michigan 48231

Attention: Chief, Permits Branch

Dear Sir:

Reference is made to Public Notice No. 0-3-D, dated August 21, 1974, regarding maintenance dredging in the Detroit River.

We have reviewed the proposed work to evaluate its effect on water quality in the area, and based on our review, the following comments are offered:

1. Excavate, dredge, or fill in the watercourse so as to minimize increases in suspended solids and turbidity which may degrade water quality and damage aquatic life outside the immediate area of operation.

2. Investigate for water supply intakes or other activities which may be affected by suspended solids and turbidity increases caused by work in the river, and give sufficient notice to the owners of affected activities to allow preparation for any changes in water quality.

3. Assure that deposition of dredged or excavated materials on shore, and all earthwork operations on shore will be carried out in such a way that sediment runoff and soil erosion to the watercourse are controlled and minimized. Spoil materials from watercourse or onshore operations, including sludge deposits, will not be dumped into the watercourse. Place all dredged or excavated materials on upland property in a confined area to prevent the return of polluted materials to the river by surface runoff, or by leaching.

4. Assure that upon completion of earthwork operations, all fills in the watercourse, or on shore, and other areas on shore disturbed during construction will be seeded, riprapped or given some other type of protection from subsequent soil erosion.

5. Take special care to avoid any spillage of oils, fuels, or any other types of pollutants while working within or along the banks of the waterway. Specific plans should be formulated in advance of construction to contain such spills in the event of any contingency.

The opportunity to comment on this public notice is appreciated.

Sincerely yours,

Donald A. Wallgren
Chief
Federal Activities Branch

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926
A. GENE GAZLAY, Director

April 21, 1975

District Engineer
Detroit District
U. S. Corps of Engineers

NCEED-T-2-M
Refer to your file _____

We acknowledge receipt of your public notice dated 31 March 1975 with reference to the application of U.S. Corps of Engineers, P.O. Box 1027, Detroit, MI (name and address of applicant)

for a Federal permit disposal from dredging, access channel. (description of project)

in Detroit River (water affected).

The Department of Natural Resources ( ) will object (X) will not object to the work as proposed. Under authority of (X) Act 346, P.A. 1972, as amended, ( ) Act 247, P.A. 1955, as amended, a permit ( ) has been (X) has not been issued to the applicant.

Our objection is based on the following:

Our approval is subject to the following:

State permit not required.

Copies to:
Regional Manager Laycock
Fish Division 1
Game Division 1
Water Resources
Waterways
District Boyer (2)
Fed. Pollution
Applicant 1

DALE W. GRANGER, Chief
Hydrological Survey Division

D. J. Haywood
Submerged Lands Management Section
Bureau of Water Management

ERNEST CEDRONI
General Manager

METRO WATER DEPT.
Water Board Building
Detroit, MI 48226
(313) 224-4800

August 30, 1974

Department of the Army
Detroit District, Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Attention: Col. James E. Hays

Re: Public Notice,,
Derrick Boat Maintenance Work
Detroit River, Grosse Ile, Michigan

Gentlemen:

The public notice regarding derrick boat maintenance in the Detroit River at Grosse Ile, Michigan has been reviewed insofar as Detroit Metro Water Department interests are concerned.

There is no apparent conflict between Detroit Metro Water Department interest and the proposed operations.

Very truly yours,

E. M. Benadeo
Head Engineer of Water System-Design

By L. Petrykowski
L. Petrykowski
Engineer of Water System

RD:hrw

FREDERICK D JOELS
GENERAL SUPERINTENDENT
DISTRIBUTION OPERATIONS

MICHIGAN CONSOLIDATED GAS COMPANY

October 4, 1974

Department of the Army
Detroit District , Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Attention: James E. Hays
Colonel, Corps of Engineers
District Engineer

Dear Sir:

In response to your Public Notice of 21 August, 1974, regarding Derrickboat Maintenance Work, Detroit River, we are sending the enclosed drawing E-48-846, showing our 12" pipeline crossing the lower Trenton Channel for your records.

We respectfully request that the rock disposal from the channel cleanout not be deposited over our existing main location.

Thank you for advising us of your proposed work. Please advise if we can be of further assistance.

Sincerely,

Frederick D. Joels

JA/pw
Enclosure

CORRESPONDENCE RECEIVED IN RESPONSE TO THE DRAFT ENVIRONMENTAL STATEMENT

APPENDIX F

Ministry of the
Environment

TEL: 965-6954

135 St. Clair Avenue West
Suite 100
Toronto Ontario
M4V 1P5

October 15, 1975

U.S. Army Engineer District, Detroit
P.O. Box 1027
DETROIT, Michigan
U.S.A. 48231

Attention: Chief, Environmental Resources Branch

Dear Sir:

Re: Maintenance Dredging of the Federal Navigation Channels in the Detroit River, Michigan

I have reviewed the August 1975 draft environmental statement for the above-mentioned project.

The statement does not clearly identify how much material is to be dredged from each channel, describe the quality of that material, or indicate the disposal site location. The classification of the sediments is based on 1970, 1973 and 1974 EPA surveys when sampling was apparently done at their water quality stations at fixed river ranges. It has been our experience that a sampling program designed to collect representative samples of material to be dredged may yield quite different results (due to the depositional characteristics of the river) from a routine monitoring program. There is no elaboration of how EPA determine the pollution status of the material, but it would appear that they have used the Jensen criteria "or bulk sediment analysis" rather than a specific assessment of the dredging operation.

The statement would be more useful if references were provided for the claims made. In Section 4.01(3), the amount of micro-toxic heavy metals reintroduced is reportedly insignificant, but in Section 5.03, the release of nutrients and heavy metals is an unavoidable impact. Further, nutrients and heavy metals are claimed to exist in a "stable non-reactive status" although they are widely reported in the literature to interact with the overlying water. Section 4.03 says "it has been noted ..." an impossible statement to verify as presented.

. . 2

Short-term localized problems are acknowledged without indicating whether they will violate State of Michigan water quality standards.While dredging in Province of Ontario waters, the Corps will be expected to comply with this Ministry's "Guidelines and Criteria for Water Quality Management in Ontario (copy attached).

Little detail is provided on actual impact assessment. Will the dredge hoppers be allowed to overflow when dredging polluted sediments? What levels of contaminants can be anticipated in the overflow? What impact will these levels have on the aquatic organisms at the site? What organisms will be buried at the open water disposal sites? How long will it take for the benthic organisms to re-establish? What effect will that have on the fishery?

The statement indicates that the Lake Erie Sailing Course dredged spoils would be open water disposed on the Canadian side of Lake Erie, although no sediment sample results are presented for that channel. Please forward to this office whatever data are available to classify those dredge spoils.

We concur with the decision not to dredge any contaminated spoils until the Pointe Mouillee disposal facility is available. Would you update me on the status of that project and forward any details on the final design. I am particularly interested in design studies that may have been done to determine how effectively the facility will confine mercury contaminated sediments. This Ministry should also be kept informed of any dredging scheduled for Ontario waters of the St. Clair system, Detroit River or Lake Erie.

Thank you for giving us the opportunity to comment on the proposed dredging.

Yours very truly,

W. D. Wilkins, Chief
Environmental Impact Assessment
Water Resources Branch

WDW/rs
~~attach.~~
c.c.: R. W. Slater, Ontario Regional Director,
Environment Canada
A. Appleby
D. Osmond
S. Salbach
G. Mills

Advisory Council
On Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

October 28, 1975

U.S. Army Engineer District, Detroit
ATTN: Chief, Environmental Resources Branch
P.O. Box 1027
Detroit, Michigan 48231

Dear Sir:

On September 29, 1975, the Advisory Council received your environmental Statement for Maintenance Dredging in the Detroit River, Michigan. Pursuant to our responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, we have determined that your draft environmental statement does not contain adequate data on cultural resources.

While you have discussed properties that are presently on the National Register of Histroic Places and have determined that your project will have no effect on those properties, you have not provided evidence that all properties that may be eligible for the National Register have been considered in accordance with our Procedures (36 CFR Part 800). Please furnish this additional information.

The final environmental statement should contain evidence of full compliance with our procedures and a copy of the comments of the Michigan State Historic Preservation Officer.

Should you have any questions or desire any additional assistance please contact Charles Spilker of the Advisory Council staff at (202) 254-3380.

Sincerely yours,

John D. McDermott
Director, Office of Review
and Compliance

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
(215) 596-1671

8400
November 19, 1975

Mr. P. McCallister
Chief, Engineering Division
Department of the Army
Detroit District, Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Refer to: NCEED-ER, Draft
Environmental Statement,
Maintenance Dredging,
Detroit, MI

Dear Mr. McCallister:

Since most of the dredge disposal will not be on land, and the only on-land disposal is already described (p.8), we have no comments on the above statement.

Sincerely,

DALE O. VANDENBURG
Staff Director
Environmental Quality Evaluation

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

November 10, 1975

Mr. P. McCallister
Chief, Engineering Division
Corps of Engineers - Detroit District
U. S. Department of the Army
P. O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This is in reference to your draft environmental impact statement entitled "Maintenance Dredging of the Federal Navigation Channels in the Detroit River, Michigan". In order to expedite transmittal of the enclosed comments from the National Oceanic and Atmospheric Administration, we are sending them to you as they were received in this office.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving six (6) copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure - Memo from Mr. Eugene J. Aubert, Director, GLERL

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

October 28, 1975

TO : Director
Office of Ecology and Environmental Conservation, EE

FROM : Eugene J. Aubert
Director, GLERL

SUBJECT: DEIS 7509.64 - Maintenance Dredging of the Federal Navigation Channels in the Detroit River, Michigan

The subject DEIS prepared by the Corps of Engineers, Detroit District, on environmental effects of maintenance dredging in the Detroit River has been reviewed and comments herewith submitted.

There are no objections to the maintenance dredging in the Detroit River with disposal of clean spoil in Lake Erie and that of polluted spoil in a diked area.

It appears that the most shoaling in the seven mile long East Outer Channel comes from the surrounding bottom material of Lake Erie. Samples should be taken from the nearby Lake Erie bottom and compared with the samples from the navigation channel. If the channel shoaling material could be disposed of in open lake without downgrading lake bottom characteristics, savings would be realized in disposal costs and in extending the life span of the diked disposal facility.

United States Department of the Interior

OFFICE OF THE SECRETARY
NORTH CENTRAL REGION
[illegible] DEARBORN STREET [illegible]2nd FLOOR
CHICAGO, ILLINOIS [illegible]60604

ER 75/954

November 14, 1975

Colonel James E. Hays
District Engineer
U. S. Army Engineer District
Detroit
P. O. Box 1027
Detroit, Michigan 48231

Dear Colonel Hays:

The Department of the Interior has reviewed the Draft Environmental Statement for Maintenance Dredging of the Federal Navigation Channels in the Detroit River, Wayne and Macomb Counties, Michigan, as requested in Mr. P. McCallister's transmittal letter of September 25, 1975. Our comments which are of a general nature relate to areas of our jurisdiction and expertise and have been prepared in accordance with the National Environmental Policy Act of 1969.

Three Land and Water Conservation Fund (LWCF) projects -- Harrison Street Riverfront Park (26-00370), River Boat Launch Park (26-00165), and three fishing piers at Belle Isle (26-00622) -- may be affected by the planned maintenance dredging. Such activity involving the existing channel may impact the River Boat Launch Park (near the mouth of the Ecorse River and across from Mud Island) and fishing piers on Belle Isle. Impacts on Belle Isle and River Boat Launch Park probably are temporary and concern such items as noise and stirring up of sediments. While these impacts have been mentioned elsewhere in the draft, we believe that a subsection on the Impacts on Recreation should be included in the final statement.

Extending the turning basin located south of the Grosse Isle Bridge to its maximum dimensions apparently would require dredging and subsequent use which may impact the Harrison Street RiverfrontPark. More information should be provided on this extension. Possible impacts would include stirring up of sediments, conflicts between lake vessels and recreational boats, and removal of polluted sediments. We understand, however, that this portion of the project was classified as inactive in 1970 and that deauthorization has been requested. The actual status should be discussed, as should the impacts of maintenance of the existing 21-foot channel depth if the 28-foot channel and extension of the turning basin are deauthorized.

Sincerely yours,

Madonna F. McGrath

Madonna F. McGrath
Acting Special Assistant
to the Secretary

AMERICAN REVOLUTION BICENTENNIAL [illegible]-1976

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5
18209 DIXIE HIGHWAY
HOMEWOOD, ILLINOIS 60430

October 9, 1975

IN REPLY REFER TO 05-00.5

U. S. Army Engineer District, Detroit
P. O. Box 1027
Detroit, Michigan 48231

Attention: Chief, Environmental Resources Branch

Gentlemen:

As requested, we have reviewed the draft environmental statement for proposed dredging of the connecting channels of the Detroit River, Michigan and have no comments concerning the statement.

The opportunity to review and comment on the draft environmental statement is appreciated.

Sincerely yours,

Donald E. Trull
Regional Administrator

BY: W. G. Emrich
W. G. Emrich, Director
Office of Environment and Design

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
SOUTH DEARBORN ST
CHICAGO ILLINOIS

RE: 75-093-133
D-COE-F32031-MI

Mr. P. McCallister
Chief, Engineering Division
U. S. Army Engineer District, Detroit
P. O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

We have completed our review of the Draft Environmental Impact Statement (EIS) for Maintenance Dredging of the Federal Navigation Channels, Detroit River, Michigan as requested in your September 25, 1975 letter. Based on the information provided in the EIS, we have no major objections to the proposed dredging and find the EIS to be satisfactory.

Due to the highly polluted nature of certain segments of the Detroit River, we request that special precautions be taken to minimize water quality degradation during maintenance activities. Consideration should be given to the use of special pollution abatement measures and equipment such as reduced hopper overflows, barrier curtains, etc. As noted in the EIS, our December 11, 1974 comments regarding the proposed project recommended the incorporation of a number of pollution abatement procedures to minimize adverse water quality impacts. These procedures should be included in the Final EIS.

The Final EIS should address the biological and physical effects of placing rock materials (page 8) removed by the grab dredge upon uplands, compensating dikes and in the deep water adjacent to the channel. The percentage of the material in terms of rock, sand, etc. that is being dredged should be described.

Based on the above discussion, we have classified the project as LO (Lack of Objections) and have rated the EIS as Category 1 (Sufficient). We appreciate the opportunity to review this Draft EIS. When the Final EIS is filed with the Council on Environmental Quality, please forward two copies to us.

Sincerely yours,

Donald A. Wallgren
Chief,
Federal Activities Branch

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

HOWARD A. TANNER, Director

November 3, 1975

Mr. Philip McCallister, Chief
Engineering Division
Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Re: NCEED-ER

Dear Mr. McCallister:

We have reviewed the draft environmental statement for the proposed maintenance dredging of the federal navigation channels in the Detroit River. The statement provides a generally adequate discussion of the environmental effects associated with the proposed maintenance.

We do have several questions and comments on the draft which will be addressed to page and paragraph in the text as follows.

Page 1 - 1.01
In order to minimize the re-depositing of sediments (especially when the hopper dredge is removing fine materials) it would appear desirable to work from an upstream to downstream direction. For the same reason, it would also appear desirable to complete the River Rouge maintenance dredging prior to that portion of the Detroit River lying below the mouth of the Rouge.

Page 8 - 1.15
It is our impression that most maintenance dredging involves removal of re-deposited silty and sandy materials. We're curious as to where the "principally rocky" materials come from. Are these materials re-deposited in the channel or blasted loose to deepen channels?

Page 9 - 1.19
It is stated that a cost-benefit analysis is not provided because of the intangibility of the benefits. It is further stated that the district engineer is aware of the utilization at the project and furnishes same with a request for maintenance funds. Cannot information on the utilization be

summarized for inclusion in the EIS? Also, how do the costs and environmental impacts of other modes of commercial transportation (I.E. railroads) compare with the costs of shipping, channel maintenance, and disposal of dredged materials?

Page 12 - 2.02
In addition to the numerous commercial vessels, mention should also be made of the thousands of pleasure boaters that use the area.

Page 16 - 2.20
The information regarding the plantings of salmon and trout should be updated. In each of the years 1974 and 1975: 300,000 chinook salmon and 50,000 steelhead were planted off the south end of Belle Isle; 100,000 chinook and 100,000 coho salmon were planted in the Huron River south of Detroit. In 1974, 20,000 brown trout were stocked in the north channel of the lower St. Clair River and near Detroit.

Page 18 - 2.21
Common loons do not breed in this part of Michigan as is stated.

Page 18 - 2.22
Gulls and terns are not "shorebirds". We suggest substitution of "non-game water birds."

Page 18 - 2.23
This paragraph should appear under recreation on page 16 under item F. Also, it should be noted that about 1,000 scaup per square mile of open water have been shot annually in recent years in the area between Celeron Island and Detroit Light.

Page 18 - H.
We feel data on visible oils (a pollutant affecting water quality) should be included in this section.

Page 22 - 2.34
It is stated the upper Livingstone Channel is considered to be unpolluted according to data collected by EPA in 1970 and 1973. Three sampling stations (9.2, 8.59, 7.4) are indicated (fig. 8, page 53) for upper Livingstone channel, but only data for station 9.2 can be found in Appendix B. Where is the data for station 8.59 and 7.4? This data should be included in the final EIS.

Page 24 - 2.42
The Great Lakes Sturgeon should be included in this paragraph, since it is likely to occur in the Detroit River.

Page 28 - 4.05 (2)
The references to recolonization of surviving organisms should include an estimated time frame in which this occurs.

Page 28 - 4.06
No effects of the disposal on bird habitat are given. This should be provided in the final EIS.

Page 29 - 4.07
It should be mentioned that invertebrates are an important part in the diet of fishes as well as waterfowl.

Page 29 - 4.08
No references are given for the benthic studies referred to that were conducted in the late 1950's and in 1965. From a scientific standpoint they deserve the same citation in the reference section as census data, water quality data, and dredging studies.

Page 34 - 6.08
In regard to the need for maintenance dredging to maintain depths for deep draft vessels, has any consideration been given to the possibility of designing lake freighters which can operate efficiently at lesser depths? We feel that such a discussion would be a useful addition to the environmental statement and suggest it be incorporated in the final EIS.

Page 54 - Figure 9
The 6th station entry under "Livingstone" on page B-7 is 1.05-0.2E (Appendix B). This station cannot be found on the location map in Figure 9. Could this correspond to station 1.05-0.4E on Figure 9? This should be clarified in the final statement.

We trust these comments will be useful in the preparation of the final EIS. Should you have any questions, please contact us.

Sincerely,

Howard A. Tanner
Director

MICHIGAN DEPARTMENT OF STATE
RICHARD H. AUSTIN SECRETARY OF STATE

LANSING
MICHIGAN 48918

MICHIGAN HISTORY DIVISION
ADMINISTRATION, ARCHIVES, HISTORIC SITES, AND PUBLICATIONS
3423 N. Logan Street
517-373-0510
STATE MUSEUM
505 N. Washington Avenue
517-373-0515

September 11, 1975

Col. P. McCallister
U.S. Army Corps of Engineers, Detroit District
P.O. Box 1027
Detroit, MI 48231

Dear Sir:

Dr. Lawrence Finfer, Environmental Review Coordinator, has reviewed the proposals for maintenance dredging in the Detroit and Rouge Rivers. He concludes that these projects will have no effect on cultural resources.

Thank you for giving us the opportunity to comment.

Sincerely yours,

Martha M. Bigelow

Martha M. Bigelow
Director, Michigan History Division
and
State Historic Preservation Officer

MMB/LF/cw

Coleman A. Young, Mayor
City of Detroit

City Engineering Department
Ninth Floor Cadillac Tower
Detroit, Michigan 48226

October 22, 1975

GEN: JJC
Maintenance Dredging
Of The Detroit River

U. S. Army Engineer District, Detroit
ATTN: Chief Environmental Resources Branch
P. O. Box 1027
Detroit, Michigan 48231

Gentlemen:

The above proposed project has been reviewed insofar as the Detroit City Engineering Department's interests are concerned.

There is no apparent conflict between Detroit The City Engineering Department's interests and the proposed operations.

Very truly yours,

H. T. DUDLEY
Director

By:
J. J. COVERT Assistant
City Engineer Administrative

DEB/jlh
cc: File

Planning Department
801 City-County Building
Detroit, Michigan 48226
(313) 224-6380

Coleman A. Young, Mayor
City of Detroit

October 20, 1975

Mr. Leland Hooker
Southeast Michigan Council of Governments
800 Book Building
1247 Washington Boulevard
Detroit, Michigan 48226

Dear Mr. Hooker:

Re: Draft E.I.S. Review - Maintenance Dredging of Federal Navigation Channels: (1) Detroit River (SEMCOG Control No. EN-750557), (2) Rouge River (SEMCOG Control No. EN-750572)✓

The City of Detroit Planning Department has reviewed the Draft Environmental Impact Statements, prepared by the U.S. Army Corps of Engineers, for their proposed Maintenance Dredging Operations on both the Detroit and Rouge Rivers.

The Planning Department, upon careful review of the two draft E.I.S.'s, finds no serious objections to the proposed dredging operations on either the Detroit or Rouge Rivers, nor do the dredging operations conflict with any policies, plans or programs of the City of Detroit.

Sincerely,

Homer Hall

Homer Hall
Assistant Director

HH/TA/hm

SOUTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS

November 5, 1975

Mr. Philip McCallister
Chief, Engineering Division
U.S. Army Engineer District, Detroit
P. O. Box 1027
Detroit, MI 48231

RE: Draft Environmental Impact Statement
"Maintenance Dredging of the Connecting
Channels of the Detroit River, Michigan"
Areawide Clearinghouse Code: EN 750557

Dear Mr. McCallister:

As the certified A-95 Clearinghouse for Southeast Michigan, SEMCOG has received and reviewed the above cited Draft Environmental Impact Statement. In accordance with standard A-95 procedures, the counties of Monroe and Wayne; and the City of Detroit have been requested to review and comment on this Impact Statement.

To date, comments have been received from only the City of Detroit Planning Department (see enclosure). As comments are received from the other agencies, they will be promptly forwarded.

A review of SEMCOG's planning efforts to date indicates that this proposal does not fall directly within the scope of any adopted plans or planning work underway. Thus, the comments which follow are not made in light of any adopted regional plans. Rather, they are made in light of A-95's allowed "Subject Matter of Comments and Recommendations" (OMB Circular A-95, as revised, paragraph 5).

Our comments are as follows:

This draft E.I.S. is similar to others previously reviewed that were concerned with the Corps dredging operations of Waterways in the Detroit area. (See review of draft E.I.S. for dredging channels into Lake St. Clair, dated September 8, 1975).

800 BOOK BUILDING · 1249 WASHINGTON BLVD. · DETROIT, MICHIGAN 48226 · TEL. (313) 961-4266

It is noted that dredged material is polluted with several contaminants such as zinc, lead, mercury, among others. An effort should be made to effectively monitor these pollutants and keep any re-introduction of them minimal.

As has been stated on several previous occasions, consideration should be given to contaminant removal from the dredged material in contrast to diked disposal. We feel that the entire summary discussion of dredging alternatives and disposal alternatives should be expanded upon in the final E.I.S.

Due to the very nature of the dreding operation, adverse environmental effects, such as turbidity and benthos destruction will occur.

None the less while there will be negative effects even if the positive effect of the operation includesthe removal of contaminated sediments from the river bottom and maintenance of the shipping channels. We recognize the necessity for this maintenance, and are in full agreement with the termination of open lake disposal of polluted material. In our opinion, the benefits resulting from this operation appear to outweigh the adverse effects.

We wish to thank the Army Corps of Engineers for the opportunity to comment on this draft E.I.S. Our hope is that these comments will assist the Corps when the final Environmental Impact Statement is prepared and issued.

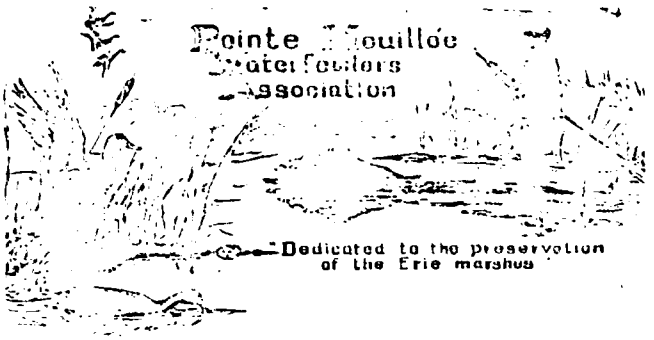
Sincerely,

Leland W. Hooker

Leland W. Hooker, Manager
Environmental Programs

LWH:lh
Enclosures

cc: City of Detroit Planning Department
Monroe County Planning Commission
Wayne County Planning Commission



October 27, 1975

Subject: Draft Environmental Statement - Maintenance Dredging of the Federal Navigation Channels in the Detroit River, Michigan (August 1975)

To: U.S. Army Engineer District, Detroit
Attn: Chief, Environmental Resources Branch
P.O. Box 1027
Detroit, Michigan 48231

Dear Sir:

The Pointe Mouillee Waterfowlers Association, an affiliate of the Michigan United Conservation Clubs, appreciates the opportunity to comment on the Draft Environmental Statement, Maintenance Dredging of the Federal Channels in the Detroit River, Michigan dated August 1975. Our concern is basically limited to those portions of the Statement which relate to the proposed dredging of the polluted sediments and disposal into the Pointe Mouillee Confined Disposal Facility (CDF). We commented on the CDF concept in a separate Environmental Impact Statement which was published and filed with the Council on Environmental Quality April 5, 1974 (see Pg. 248 of that document). The Waterfowlers wholeheartedly support this project and urge the timely completion of the Pointe Mouillee CDF.

Removal operations in the Detroit River were suspended in 1971 - 72 because of polluted dredged materials. The strategic importance of the navigation channels in the lower Detroit River to water borne commerce dictates the need for maintenance dredging and the resultant disposal requirements at Pointe Mouillee. This facility, when constructed, will benefit commercial interests and national security directly. As a unique feature the CDF will provide indirect benefits for the flora and fauna indigenous to the region. Certain aspects of the concept offer mitigation for the irretrievable loss of aquatic habitat along the west shore of Lake Erie.

The Waterfowlers conclude that maintenance of navigation channels in the Detroit River and in the shoal waters of the Lake Erie Sailing Course at Seewey depth is a necessary function given the state of our economy. However, we do feel strongly about the continuing unresolved conflict which was not mentioned in the Statement. It is the persistent question of monoculture versus biological variability. Has the pendulum swung too far in the direction of commercial use of this strategic waterway to the absolute detriment of other considerations? Can commercial navigation coexist with the biota of the region? What is the total impact of dredge and fill activities on the migrational processes of diving ducks using the Chesapeake Bay Waterfowl Migration Corridor? Is the U.S. Army Corps of Engineers ever really going to address this phenomenon? We would insist on it and this Statement is a good place to start. The whole idea of asserting compatibility needs to be expressed more acutely from a scientific position.

cc MUCC
U.S. Fish and Wildlife Service

Richard G. Micka
1216 Riverview
Monroe, Michigan 48161

United States Steel Corporation
RAW MATERIALS DIVISION

G. S. NEEL
AREA SALES MANAGER—CENTRAL
N. V. McLEAN
DISTRICT REPRESENTATIVE

3001 WEST BIG BEAVER ROAD
TROY, MICHIGAN 48084
313/649-2900

September 30, 1975

U. S. Army Engineer District, Detroit
ATTN: Chief, Environmental
Resources Branch
P. O. Box 1027
Detroit, Michigan 48231

Thank you for the latest Environmental Statement dated August 1975 concerning maintenance dredging of the federal navigation channels in the Detroit River and disposal of polluted sediments at Pointe Mouillee. Our primary interest in this matter is that of a possible supplier of stone for the construction of the disposal facility. Though we concur with the desire of the Lake Carriers Association to maintain lake traffic through dredging and necessary disposal facilities, we are not qualified to comment on environmental aspects.

Very truly yours,

N. V. McLean
District Representative

NVMcL/ses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